TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

MIRO MARTTILA

LABOR PRICING IN GLOBAL ENVIRONMENT

Master of Science Thesis

Examiner: Professor Petri Suomala
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ABSTRACT

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When calculating the hourly rate and defining the hourly price a global company is facing many challenges. This thesis is written in co-operation with one of these companies who started a project to review and align its labor pricing in the global market environment. The aim is in the theory part to define the cost basis for labor hours and to discuss about general pricing methods and pricing process. Then in the empirical part the main target is to describe the current situation and the challenges faced in the case company and analyze these challenges based on the theory part. Finally certain guidelines and next steps are recommended how to continue further with the alignment project.

This thesis was utilizing action-oriented approach as the empiricism has a significant role and the approach is mainly descriptive with certain normative features. The empirical part is a case study and the approach was participant as observer since the study was conducted by actively taking part in the operations of the case organization. In addition to the notes taken by participant as observer, data from the current situation was collected by discussing with the relevant co-workers and by going through existing documentation. Also several case interviews were conducted with representatives from relevant departments especially as the challenges and possible solutions were analyzed.

Currently the case company uses cost-plus method in pricing labor hours as part of a delivery project. Entity specific hourly rates are locally calculated and reviewed annually. Hourly rate is then added with the mark-up and the calculated prices are subject to adjustments related to general market environment. Challenges in pricing can be divided into five categories: internal and external transparency, global market environment, steering effect of pricing and pricing strategy in downturn. Internal transparency is about the transparency within the company e.g. to the exact structure of hourly rates, whereas external transparency refers to sharing information with customers. Global environment requires guidelines how to handle different price levels in different locations: labor originates in India, project is delivered in Brazil and customer is from US – which location should define the price level. Steering effect is about decision making e.g. between internal labor and subcontractors whereas pricing in downturn focuses on trade-off between managing the margin level and maintaining the market share.

To respond the defined challenges, the recommendation for future guidelines would be to transfer from cost-plus pricing to more value oriented pricing. The hourly rate would no more directly affect the hourly price but the labor would be categorized to a few categories and an hourly base price would be defined for each category. The base price would then be adjusted by multiplying factors based on certain variables, e.g. locations.

TIIVISTELMÄ

MIRO MARTTILA: Työn hinnoittelu globaalissa toimintaympäristössä
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Oman työn hinnoitteluun liittyy monia haasteita globaalissa toimintaympäristössä. Tämä diplomityö toteutettiin yhteistyössä globaalin yrityksen kanssa, joka aloitti projektin harmonisoidakseen tuntihinnoittelukäytäntönsä. Työn tavoite on teoriaosuudessa määritellä kustannusrakenne tuntihinnan taustalla ja keskustella hinnoitteluteorioista sekä -prosesseista. Empiirisessä osuudessa tarkoituksena on kuvata kohdeyrityksen nykyinen hinnoittelukäytäntö sekä analysoida siihen liittyviä haasteita teoreettisen viitekehyksen pohjalta. Lopuksi esitellään suositukset projektin seuraaviin vaiheisiin.

Tutkielmassa hinnoittelua lähestytään toiminta-analyyttisestä näkökulmasta. Empirialla on merkittävä rooli ja lähestymistapa on pääsosin deskriptiivinen sisältäen joitakin normatiivisia piirteitä. Empiirinen osa on case-tutkimus ja se on toteutettu osallistuvan havainnoijan roolissa, sillä tutkija osallistui aktiivisesti kohdeyrityksen toimintaan. Tehtyjen havaintojen ja muistiinpanojen ohella informaatiota kerättiin keskustelemalla muiden työntekijöiden kanssa sekä tutustumalla olemassa olevaan dokumentaatioon. Lisäksi asianomaisten funktioiden edustajien kanssa järjestettiin useita teemahaastatteluita erityisesti kohdattuja haasteita ja niiden mahdollisia ratkaisuja analysoitaessa.

Nykyään kohdeyritys käyttää kustannusperusteista hinnoittelua määrittäessään sisäisen työn hinnan osana toimitusprojektia. Eri lokaatiot määrittelevät tuntihintansa itsenäisesti ja ne tarkistetaan vuosittain. Sisäiseen tuntihintaan lisätään haluttu kate, ja saatua hintaa sovelletaan markkinatilanteen mukaisesti. Havaitut haasteet voidaan jakaa viiteen kategoriaan: sisäinen ja ulkoinen läpinäkyvyys, globaali toimintaympäristö, hinnoittelun ohjausvaikutus sekä hinnoittelustrategia laskusuhdanteessa. Sisäinen läpinäkyvyys viittaa esim. tietoisuuteen sisäisen tuntihinnan tarkasta rakenteesta yhtiön sisällä, kun taas ulkoinen läpinäkyvyys liittyy tiedon jakamiseen asiakkaiden kanssa. Globaali toimintaympristö puolestaan vaatii linjaukset suhtautumisesta hintatason vaihteluun eri markkina-alueilla: työ tehdään Intiassa, projekti toimitetaan Brasiliaan ja asiakas on USA:sta – mikä lokaatio määrittää hintatason. Ohjausvaikutus liittyy päätöksentekoon esim. omien resurssien ja alihankkijoiden välillä kun taas hinnoittelu laskusuhdanteessa keskittyy tasapainoiluun katetason hallinnan ja markkinaosuuden säilyttämisen välillä.

Määriteltyihin haasteisiin vastatakseen kohdeyrityksen tulisi jatkossa siirtyä kustannusperusteisesta hinnoittelusta kohti arvoperusteista hinnoittelua. Hinnoittelu ei enää olisi suoraan johdettu kustannusrakenteesta, vaan työtunnit jaettaisiin muutamiin kategorioihin ja jokaiselle kategorialle määriteltäisiin perushinta. Tätä perushintaa sovellettaisiin edelleen tuntien hinnoittelussa esim. lokaatiokohtaisilla kertoimilla.

PREFACE

You are now reading my Master of Science Thesis for Tampere University of Technology. I am glad to say that the project is now finished and the final version of the thesis is in front of your eyes. I am also pretty satisfied with the result.

The topic for the thesis came from the case company and I want to thank the company for providing this challenging subject to me. Thanks also to my colleagues and supervisors, it was interesting to discuss with you about the different points of view to problematic issues around labor pricing.

In addition to the colleagues at the case company, a thank you belongs to the examiner of my thesis, Professor Petri Suomala. It was a pleasure to co-operate with you. The feedback and the advice from you provided a significant contribution to my thesis project.

Especially I wish to thank my family and my friends – not least for every now and then kindly reminding me about the thesis and asking if it is done already. As you come to ask me once more, now I can finally give you an affirmative reply.

Tampere, 13.12.2015

Miro Marttila

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1 Introduction to the topic

The fastest and the most effective way for a company to reach maximum profits is by being able to correctively establish its price. Setting price too low would bring customers but no margin and on the other hand setting price too high would bring margin but no customers. (For instance Guerreiro et al. 2012 and Kain & Rosenzweig 1992.) Therefore price setting for products and services is closely related to company's cost accounting. In the long run the target price must exceed the production costs and the capital costs and additionally guarantee the adequate profit margin. Cost accounting is the basis for pricing, even though there are multiple other factors related for instance to market situation, to competitors and to company's strategy that also need to be considered when making the pricing decisions. Price setting is reflecting the efforts to combine the cost basis of the company and the available price on the market. The difference between these perspectives defines the margin which represents company's competitiveness in pricing. (Neilimo & Uusi-Rauva 2012.)

In this thesis the problematic around pricing decisions is covered from labor point of view. The focus is on the cost basis of internal hours and on pricing labor hours in the global environment. Thesis is done in co-operation with a publicly listed Finnish technology company. More specifically a project was started in the case company with a topic 'Proposal and Estimation Alignment' and one sub-target of this project was to update the model used in pricing internal work and at the same time to harmonize the pricing process in the whole company including all the subsidiaries. In the text the case company is referred to with a coded name [Company X].

Traditionally Finnish engineering companies, such as [Company X], have been selling equipment and not that much labor hours or employees' personnel expertise. Labor hours have been just the side order and the focus has been on providing superior quality and excellent products. In the future the focus will not be in selling just equipment neither will it be in selling labor hours but the business model will be selling solutions. In 2014 a study was conducted at [Company X] which implies that engineering and project management hours account for about 10 percent and on the other hand equipment deliveries account for about 60 percent of the total order value the rest being logistics costs, construction costs and other costs. Thus the working hours are not the main item either in the future but with 10 percent share they have a significant effect on the total project margin. Additionally the more and more intense competitive situation highlights the

importance of all the project components and their correct pricing, especially at the time of financial downturn.

Challenges related to internal hours in certain project's life cycle from estimating and proposal to execution and delivery can be split to two categories, on one hand estimating the amount of hours needed and on the other hand using an adequate hourly rate. In general the pricing has two targets from the selling party's point of view, to get the product sold and to earn higher cash flow compared to own costs. Combining these two targets, it can be simplified that price setting is about looking for the correct price. (Kulmala 2006.) Hence it is important to understand that the term used here is an 'adequate hourly rate' and not a 'correct hourly rate' as pricing is always a result of many decisions. Thus it is not possible to define one correct hourly rate but the pricing decisions always are interacting with other business decisions. For instance relatively high price for labor hours favors projects with high share of equipment sales and on the contrary relatively low price level is favorable for projects with high share of labor hours. This thesis is about defining the adequate hourly rate.

1.2 Objectives and delimitations for the thesis

This thesis is about defining the current situation of labor pricing and related challenges at [Company X]. The importance of pricing can be underlined for both the profitability and the long-term survival of the companies. However, the field of pricing is not stable and there are no simple guidelines to find the optimal price. (Guerreiro et al. 2012.) Thus the target of this thesis is not to provide a fixed price list for the case company but to compare the alternative pricing concepts and to provide guidelines for a pricing model which would best support the case company's business operations. Guerreiro et al. (2012) also state that complex field of pricing highlights the contribution from management accounting to provide support to decision making with respect to pricing and further to optimizing global earnings. Thus this thesis also aims to provide insight how the principles for calculating hourly rate may affect the business decisions.

The thesis is written from price setting point of view and thus it is essential part of the thesis first to define the hourly cost. In the theory part the target is to describe the cost basis and main pricing approaches to pricing of labor hours and in research part the aim is to apply this knowledge to the experienced challenges in the case company. However the discussion about different allocation methods and techniques is not included. In this context it is only discussed which costs are included in the cost basis and which are not and discussion about the methods of allocation with different cost drivers are left for other forums. Similarly strategic pricing and related methods and concepts are not in the focus but they are only mentioned briefly. The main target in pricing is to be profitable in the long-run and that is the general approach to pricing in this thesis.

Another vital issue in reading the text is to have the understanding about the terms used. In general hourly rate may refer to hourly cost basis, internal hourly price or external hourly price. In this thesis the terminology is used as follows:

- **Hourly cost** – cost basis of a labor hour which in addition to direct costs may include allocated costs depending on the company practices
- **Hourly rate** – hourly cost added with possible internal margin. In case all the relevant costs are allocated and no internal margin is used, hourly rate is equal to hourly cost.
- **Hourly price** – external price for labor hours consisting of hourly rate and the desired margin.

This thesis is about discussing about the cost basis for hourly rate and about price setting methods and processes for labor hour. In addition to defining hourly rate, another challenge in cost estimation is to define the amount of labor needed. However, this thesis is not covering the issue of estimating amount of hours. Target in defining the hourly rate is not to make as exact as possible measurement about the costs per labor hour. From company point of view the target is to maximize the profit and thus the hourly rate should provide the management a reliable tool which would help them to make profitable business decisions. Additionally discussion about quality and controllability issues is only slightly touched in this thesis. Hence the basic assumption is that as labor hours in different locations are compared with each other and on the other hand with subcontractor hours, the idea is that all the hours are similar and the focus is on comparing the hourly rate and hourly price.

The research part of the thesis is written from the [Company X] point of view and the challenges are observed in its business environment. However, most of the industrial companies are applying hourly rates in their cost accounting and pricing decisions and thus the ideas and observations in this thesis may be useful for them as well. The first priority in the thesis is to identify the factors behind the hourly price used in delivery projects but same principles can be applied also when defining hourly rate for internal purposes. Further, the pricing methods and principles in the case company are described truthfully but no hourly rates, margins or other financial information are included as they are. If any [Company X] related numbers are presented in this thesis, numbers are modified but in the way that they are relevant and comparable in the context they are used. Taxation point of view is excluded from the scope of this thesis.

1.3 Research approach

To define a suitable research methodology and to choose research methods to support this methodology are an essential part of planning the research. Ignoring the proper definitions of either one of these may result in inadequate results. (Ryan, Scapens & Theobald 1992.) In general research approach can be described in the scale of theoretical and

empirical research and on the other hand in the scale of descriptive and normative research. Neilimo and Näsi (1980) divided the research approaches in finance to four categories: conceptual approach, nomothetical approach, decision-oriented approach and action-oriented approach. In addition to these, Kasanen, Lukka & Siitonen (1993) defined the constructive approach and placed the research approaches to the four sections described by research types as presented in figure 1.

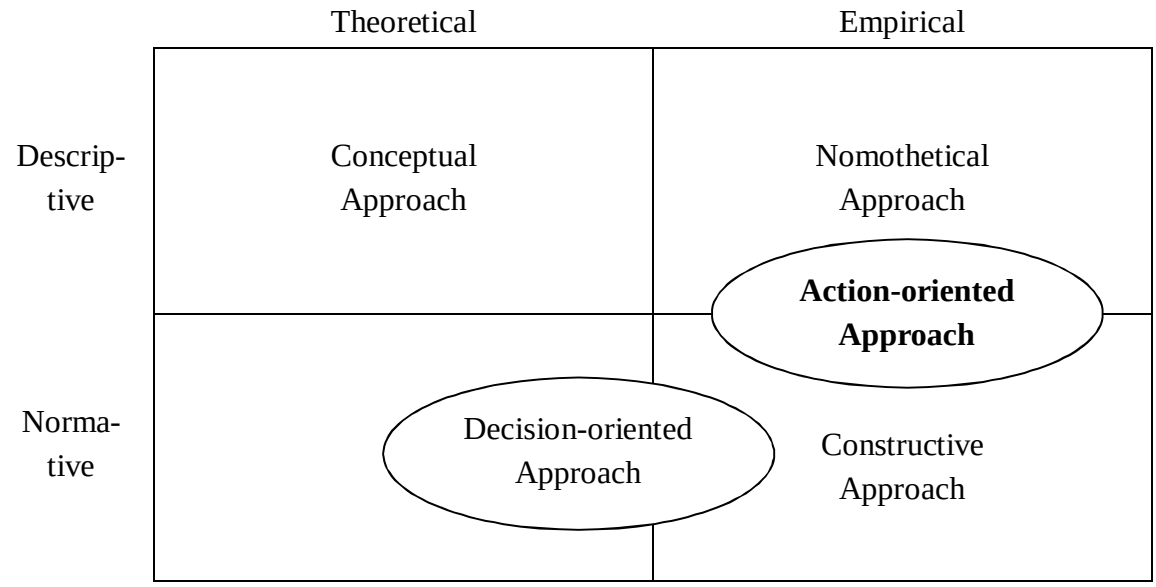

Figure 1. *The accounting research approaches (Kasanen, Lukka & Siitonen 1993).*

It can be seen that all the research approaches are not simply placed to one of the four sections. Additionally in some cases the research may include characteristics from more than one of the research approaches, which may cause challenges in exact definition of research methodology (Neilimo & Näsi 1980).

This thesis approaches the topic from both the descriptive and normative point of view. Additionally empiricism has a significant role and thus the thesis is mainly using action-oriented approach (bolded in figure 1) even though it also has certain characteristics from decision-oriented approach. Action-oriented approach aims at understanding the target phenomena but it may also have normative targets to change the current situation. Empiricism is included through few cases and the methods are non-restricted and diverse. The focus is not that much in defining general theories but in creating concepts to better understand the business. Compared to action-oriented approach, decision-oriented approach neither aims at general theories but where action-oriented approach is about understanding the phenomena, the decision-oriented approach aims at providing the method to solve the defined problem. Supporting decision making is the first priority whereas empirical data and finance theories are to support the first priority. (Neilimo & Näsi 1980.)

The thesis is about problematic around the individual case aiming to provide the understanding to the current situation and additionally to recommend some actions to enhance current situation. Especially the further research on this topic would be very close to decision-oriented approach aiming to provide the method to solve the current challenges but as such the thesis is more action-oriented.

Thesis includes both theoretical and empirical parts, which are providing a subjective view to the topic. The conceptual approach is being utilized in theoretical part where a wide literature review is done to the current theories and earlier research. The literature review results to a theoretical framework which the empirical part is then based on.

The empirical part is a case study and the research was conducted by actively participating to the operations of the target organization. Saunders, Lewis & Thornhill (2009) categorize the active participants based on how actively the researcher participates and on the other hand if the organization is aware of the identity of the researcher to four categories: complete participant, participant as observer, observer as participant and complete observer (see figure 2).

	Identity known	Identity hidden
Active	Participant as observer	Complete Participant
Passive	Observer as participant	Complete observer

Figure 2. *Roles of observer (Saunders, Lewis & Thornhill 2009)*

In this study the approach was participant as observer, since researcher was working at the case company and hence actively contributing in the project. Both quantitative analysis and qualitative analysis were utilized when defining the current situation and challenges in current situation. In addition to the role of participant as observer, data was collected for instance with case interviews and going through archives and existing documents. Possible solutions to the challenges are demonstrated by utilizing scenarios in which it can be seen how changes in certain parameters affect the outcome. (Saunders, Lewis & Thornhill 2009.)

In the research part of the text the data from current situation and challenges is presented as observed in the discussions, in the meetings and in everyday working environment at [Company X]. These observations from the current situation and from the challenges are then reflected to the theories presented in the theory part of the thesis and they are discussed about with the relevant contact persons at [Company X]. In the research part the current situation and the prevailing understanding in the organization are presented as facts whereas challenging these assumptions and conclusions are presented as speculation.

1.4 Structure of the thesis

This thesis consists of a theoretical part and a empirical part. Theoretical part includes the second and the third main chapters following the introduction chapter. Introduction chapter includes a short preface to the topic and additionally objectives of the thesis and research methods and methodology are described. The fourth chapter is then the research part of the thesis and finally conclusions chapter at the end summarizes the content of the thesis.

The second main chapter covers defining the cost basis for hourly rate. First subchapter is about presenting the elements included in the cost basis whereas the second subchapter handles the allocated costs in more detail. After this concept of utilization rate is discussed especially from the point of view how it affects the cost basis. The latter part of the chapter is then about showing how the hourly rate transfers costs to projects and thus has influence on project margin. At the end there is still some discussion about the relevance of allocating indirect costs. In general cost allocation is just moving costs from one function to another within the organization so what are the benefits compared to efforts used to allocating activities.

As the second main chapter provides the basis for hourly rate, the third chapter presents the main theories to price setting. Three major influences on pricing decisions are costs, competitors and customers. In practice companies must consider all of these when making price-setting decisions but the process slightly differs depending on the main approach. So at the beginning of the third chapter cost-based approach, market-based approach and value-based approach are described. Additionally certain other pricing methods are presented as an example how the three main approaches can be applied in different situations. Latter part of the chapter is first discussing about pricing process in companies and reflecting the process to the characteristics of the different pricing approaches. Finally at the last subchapter the pros and cons and some other typical features of each pricing method are summarized to provide a ground to the research part.

The fourth chapter is about pricing practices at [Company X]. The research part is built on the theoretical framework presented in the previous main chapters. At the beginning of the empirical part the research process is described step by step and the means of data

collection and data analysis in practice are presented. Presenting the actual results starts then in the second subchapter. First the current situation and current practices at [Company X] are described. After this the experienced challenges in the current model are presented and analyzed. Then certain alternative pricing models are presented that [Company X] could implement and the effect of these on the pricing and margins is outlined with some scenarios. At the end of the chapter the proposed guidelines for the future pricing model are presented.

Finally conclusions chapter collects the main ideas from the earlier chapters. Additionally there are presented next steps for the [Company X] how they could utilize the results of this thesis. At the end of the thesis there are included assumptions and more detailed calculations behind the scenarios in the fourth chapter. The assumptions are presented in tables and all the calculations are showed as formulas to support the analysis about the different pricing approaches.

2. DEFINING COST BASIS FOR HOURLY RATE

From theoretical point of view, it is simple to state that price must exceed total costs if profits are to be achieved (Bhimani et al. 2012). Also in practice this is obvious when the calculation is made on a company-level as the income statement shows the revenue and cost of sales. However, when calculating the cost for certain project or product, the first step is to discuss, how the cost basis is to be calculated. This chapter is about taking this first step and discussing about the cost basis for internal work.

2.1 Elements of cost basis for hourly rate

Eden and Ronen (1991) state that hourly rate is combination of direct and indirect costs. Split to direct and indirect costs is one way to specify the cost basis but as seen in the figure 3, there are many other ways to divide costs as well to be considered when defining the cost basis (Neilimo & Uusi-Rauva 2012). When defining the hourly rate it is vital to analyze, which costs should be included in the cost basis and which costs should be covered by the margin. From hourly rate point of view, the question would be what the cost basis for hourly rate is in the scale between direct costs and total costs.

<table>
<tr><td rowspan="2">Separable costs</td><td rowspan="2">Variable costs</td><td>Direct costs</td><td rowspan="3">Total costs</td></tr>
<tr><td rowspan="2">Indirect costs</td></tr>
<tr><td>Joint costs</td><td>Fixed costs</td></tr>
</table>

Figure 3. *Different cost classifications (Neilimo & Uusi-Rauva 2012).*

The terms in figure 3 are generally used in cost accounting but they also provide a good perspective when discussing about finding the cost basis for internal work. Direct costs of a cost object refer to costs that can be traced to a particular cost object in an economically feasible way whereas indirect costs are also related to a particular cost object but cannot be traced to it in an economically feasible way (Bhimani et al. 2012). From internal work point of view direct costs are mostly personnel costs whereas indirect costs are overhead costs allocated to working hours (Eden and Ronen 1991).

Another way to split total costs is to make the difference between variable and fixed costs. Variable costs refer to costs that change in portion to changes in cost driver whereas fixed costs cover the costs that do not change in total despite the changes in the cost driver (Bhimani et al. 2012). From internal work point of view variable costs cover

the direct costs, i.e. salaries, but also certain parts from indirect costs. For instance computers, tools and equipment are not directly personnel costs but they are changing as the number of employees and the number of working hours is changing. Then again costs like rental costs and other general infrastructure remain at certain level regardless of the amount of internal work. Of course it can be stated that in the long-run no cost is fixed cost as for instance rental cost can be changed by choosing the facilities to fit exactly to the size of the business, but in this case it is relevant to see them as fixed costs.

The way to direct further more costs to certain object is to split the costs to separable costs and joint costs. Separable costs are defined as costs that are assignable to one or more individual projects where as joint costs are costs yielding multiple products simultaneously (Bhimani et al. 2012). When comparing to the split between fixed and variable costs, for instance rental costs may be assignable to certain working hours. Rental cost of production facilities should be taken into account as one factor when defining the hourly cost for production labor. On the other hand, as [Company X] (2013) states in its internal instructions, there are also costs that cannot be allocated to certain contracts or certain internal work. These are for instance general administration and selling costs, general finance costs and depreciation of equipment that is not used to particular contract or function. Thus, even though above it was said that part of rental costs can be seen as separable costs, it is reasonable to define part of the rental costs also as joint costs.

Naturally, categorizing costs is never this simple in real life. Always from one point of view certain costs fit to first category and then from another point of view they fit to second category. Additionally the picture is slightly simplified as it shows that all the direct costs belong to variable costs and further all the variable costs can be defined as separable costs. In practice this is not the case, but in the big picture this categorizing gives the management a good basis to start discussing, which elements are affecting their cost basis and further how to take indirect costs into account when defining the hourly cost.

2.2 Allocating indirect costs

Regardless of the pricing theory used for the hourly price, in every case the company should have the knowledge of the cost basis. Management accounting needs to generate cost information to support their pricing decisions. (Guerreiro et al. 2010.) This means that the company should have the visibility and understanding to hourly rate, what is allocated in the hourly rate and what is excluded from the rate. This way the management also has the knowledge, what part of the costs the margin or mark-up must cover and on the other hand which costs must be invoiced separately.

AACE International (2009) provides recommended practice for estimating costs where they also provide instructions which items to consider when estimating the cost basis for

labor hours. Naturally, it is important to define labor productivity and working hours per day and per week to be able to define the total amount of labor needed. However, it is also important to determine labor wage rates and subcontract pricing methodology: how the labor wage rate is based on crew mix, union contracts, non-union wages, fringe benefits and other factors; what other items are included in hourly rate, for instance safety equipment, worker facilities or lunch; are subcontractor hours comparable with labor wages or are they for instance including some materials or travels or on the other hand excluding some general facility costs that are included in internal labor rates.

Another question is then, as Eden and Ronen (1991) state, depending on the situation in the company, there may be just one hourly rate covering the whole company or the hourly rate may be defined for instance per department or per type of the work task. AACE International (2010) advices to identify all the methods and information sources used for labor pricing. They highlight that appropriate details must be provided, in case the productivity and costs vary for instance between trades or locations within the project. Thus defining the cost basis and further the hourly price gets the more complicated, the larger the company gets. Especially in international companies the cost basis for certain project may differ significantly depending on where the labor originates so the management must make the decision which is the suitable amount of hourly rates.

Bhimani et al. (2012) define a six-step-approach to job costing which can be adapted to defining the hourly rate. **Step 1** is to identify the cost object, it can be the job but as well it may be one internal hour. **Step 2** is then to identify the direct costs for the cost object. The actual direct-labor cost rate must be defined by dividing actual total personnel costs by actual total direct labor-hours worked. Regardless if the cost object is a certain job or just one working hour, the idea is the same, as to get the total cost the direct-labor cost rate is just multiplied by the amount of used hours.

Step 3 is to identify the indirect costs associated with the cost object. Indirect costs may be grouped to one or more cost pools and **step 4** in the model is to select the allocation basis for each indirect cost pool. From hourly rate point of view the allocation basis is most often the amount of labor-hours even though it might be something else as well, for instance the number of employees.

In **step 5** the indirect cost rate per unit is calculated by dividing each cost-pool by the total amount of labor-hours (or other allocation base) and the total indirect cost for the cost object is calculated by multiplying the cost rate by base units. On actual basis the rate can be calculated only at the end of the time period. In case the costing is needed already earlier, the indirect cost rate may be calculated based on historical data, budget or some other professional estimate. For instance in normal costing direct costs are calculated based on actual costs whereas indirect costs are based on budgeted values. **Step 6** sums up the costs of the cost object by simply summing up direct costs and indirect costs.

In the figure 4, it is illustrated how the chosen cost basis affects when defining the hourly rate. The simplest way is to use the direct personnel cost as the costs basis and set margin so that it covers all the indirect costs. The alternative at the other end of the scale is to allocate also all the indirect costs to internal hours and only add the desired profit on top of the cost basis. Naturally in case the hourly rate should only cover the cost basis, the internal margin would not be needed in case all the indirect costs are allocated to hours.

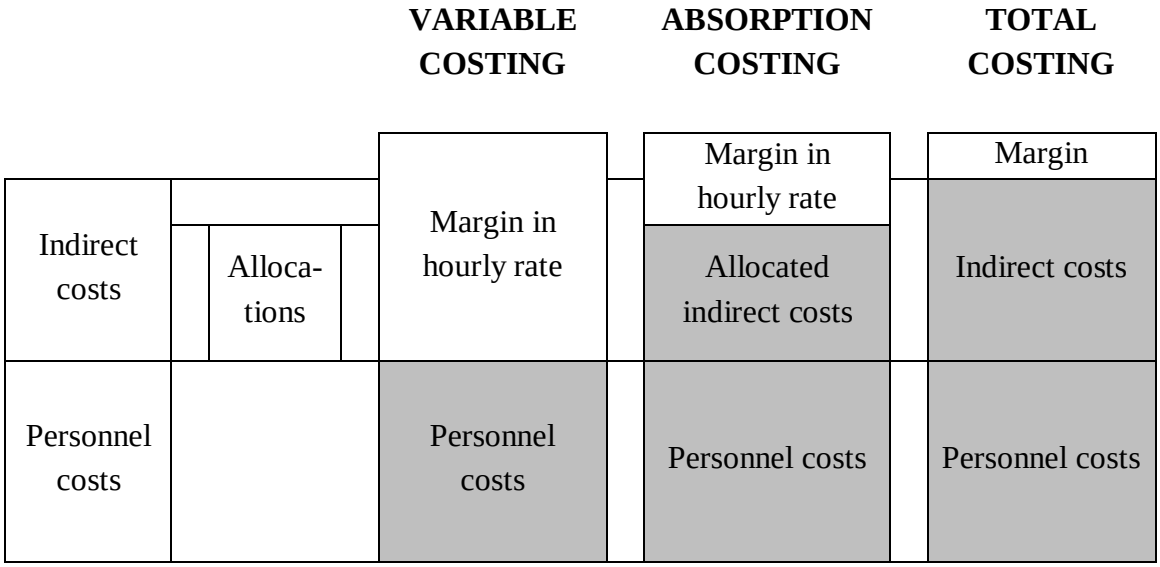

Figure 4. *Cost basis in defining hourly rate (adapting Neilimo & Uusi-Rauva 2012, Guerreiro et al. 2012).*

In figure 4 the cost basis is highlighted in grey. Comparing the three options it can be seen how the amount of allocated costs affects the cost basis and further the needed margin, if all the indirect costs are allocated to the hours, if certain part of the indirect costs is allocated or if none of the indirect costs are allocated: when using variable costing, the margin must cover indirect costs and desired profit; when using absorption costing, the margin must cover unallocated part of indirect costs and the desired profit; when using total costing margin only covers the desired profit (Guerreiro et al. 2012).

However, the chosen cost basis has no effect on the customer price or on the bottom line of the income statement in company-level. On the other hand, as the chosen cost basis possibly added with the internal margin represents the internal cost for the hours, it has effect on project-level margins. The less indirect costs are in hourly rate, the more favorable it is for project managers to prefer internal hours over hours from subcontractors and the more favorable it is for projects with high portion of labor compared to equipment and other costs. The difference between defining the internal hourly rate and external hourly price is that defining the external price cost-based, value-based or market-based directly affects the revenue also on the company level similarly as on the pro-

ject level, whereas defining the hourly rate only has effect on project margins and on company-level the net effect is zero.

2.3 Utilization rate affecting the cost basis

In variable costing the product cost consists only of direct costs, thus eliminating the problem of allocating indirect costs (Guerreiro et al. 2012). Also utilization rate has no effect on cost basis when variable costing is applied whereas in absorption costing and total costing certain utilization rate must be estimated as part of the allocation process. Bhimani et al. (2012) present the three approaches to utilization rate to calculate the costs per labor hour: actual costing, normal costing and standard costing.

Actual costing refers to the situation where both direct and indirect costs are traced to the cost object based on the actual costs. In normal costing the direct cost are similarly calculated based on the actual direct costs whereas indirect costs are calculated based on the budgeted values. In standard costing both direct and indirect costs are based on standard rates which are based for instance to budget values. (Bhimani et al. 2012.) In cost accounting these methods are generally used for costing larger wholes than just labor hours but same principles can be applied to defining hourly rates. In the table 1 it is demonstrated how the hourly rate differs depending on the used method and on the utilization rate.

Table 1. *Utilization rate affecting the hourly rate*

Direct costs (budget)	20,000
Indirect costs (budget)	10,000

Utilized hours	Case 1 **200** (budget level)	Case 2 **180**	Case 3 **220**
Direct costs / hour	100	111	91
Indirect costs / hour	50	56	45
Hourly rate			
- in standard costing	100 + 50 = **150**	100 + 50 = **150**	100 + 50 = **150**
- in normal costing	100 + 50 = **150**	111 + 50 = **161**	91 + 50 = **141**
- in actual costing	100 + 50 = **150**	111 + 56 = **167**	91 + 45 = **136**

As can be seen in the table 1, depending on the utilized hours the hourly rate may differ being higher when less hours are utilized and lower when more hours are utilized. Additionally, in this example the costs are held fixed at the budget level but in practice also the amount of costs differs between the estimate and the actuals. Hence with the same total costs the hourly rate varied between 136 units and 167 units as the utilized hours increased or decreased by 10 percent from the estimated level.

With standard costing, the cost of each hour can be calculated at the start of the project for the period that the standards are set, for instance for the financial year. This is beneficial as the project costs are more predictable and there is no need for more complicated and most likely for more expensive counting system to count actual cost per hour. So with standard costing the changes in the company-level utilization rate do not affect the hourly rate and thus the cost basis of the project. (Bhimani et al. 2012.) On the other hand there may be significant changes in the underlying costs or in the utilized hours which is not paid attention in standard costing but the variance remains in non-allocated costs and is visible only in company-level margins. Then again in normal costing the variance in direct costs and in actual costing the variance in both direct costs and indirect costs is included also in hourly rates and thus in project margins.

In terms of controllability, standard costing has certain advantages over actual costing and normal costing. Bhimani et al (2012) define controllability as the degree of influence that a specific manager has over costs, revenues or other items in question. Related to the hourly rate, the focus is on controllable costs. From this point of view the project manager has the controllability on the amount of hours used but not in direct and especially indirect costs related to hours and hence he should be responsible for efficiency variance but not spending variance in terms of labor. Using standard costing, the hourly rate is fixed and project manager is responsible for the costs that can be predicted based on the booked hours. On the other hand project manager should not be responsible, if salary costs or indirect costs increase during the period which would be affecting his costs when using normal costing or actual costing. Similarly project manager should not be responsible for price variances related to the different resources pointed to him by the management or for the exchange rate differences as long as he has no controllability on these matters.

2.4 Hourly rate affecting project margin

It can be easily shown with a calculation that choosing projects based on predetermined hourly costs may lead to suboptimal choices, as certain projects are rejected because of their low margin. Also, even though each project shows a proper margin, on entity-level the margin may suffer in case there is plenty of excess capacity. Similar situation can be caused when making the make-or-buy decisions. Buying labor hours from subcontractor may seem to be a more profitable option on a project level, but at the same time it may cause low utilization rate of own resources. The fact that the firm’s hourly rate is higher than the outside opportunity cost of contracting out does not necessarily mean that the job should be given to a subcontractor, even when the firm is in a state of full employment. The decision should be made on the basis of the return to be derived from the various alternatives and not directly on a comparison of the hourly costs of the firm and the subcontractor. (Eden & Ronen 1991.)

Especially in the long run, actual and normal costing provide better information to the company about their cost basis and thus about their profitability. However, also standards are set only for certain period, for instance annually, and constant changes in hourly rate may be more confusing than beneficial with the information about the 'correct' cost basis. There has been lots of discussion also about who is responsible for the high or especially low utilization rate in the company. An individual project manager makes the calculations from his project point of view. Possible over capacity or under capacity caused by the weak market situation or poor decisions from management should not affect the hourly rates and further profitability of a certain project which supports using the standard costing when defining the hourly rate. Of course the situation is different if the project manager can affect the direct labor costs or even indirect labor costs when normal and actual costing might be more suitable.

In previous chapter it was shown, how utilization rate may affect the hourly rate depending on the used costing method. Below in table 2 it is shown how the used hourly rate affects project margin on the project level and on the other hand gross margin on the company level. In this calculation the assumptions are based on the [Company X]: firm is using standard costing in defining the hourly rate and terms used are gross margin, project margin and sales margin. Gross margin refers to revenue minus costs of goods sold (Bhimani et al. 2012), project margin is the measure from individual project and sales margin is the combination of project margin on company level. Additionally the assumption is that total costs are fixed in all the cases.

Table 2. *Allocations effect on margins*

	No allocations	**All allocated**	**Over-absorption**	**Under-absorption**
Sales	**1,500**	**1,500**	**1,500**	**1,500**
Project costs (materials etc.)	-500	-500	-500	-500
Labor cost based on hourly rate	*0*	*-400*	*-450*	*-350*
Project costs total	**-500**	**-900**	**-950**	**-850**
Sales margin (or Project margin)	**1,000**	**600**	**550**	**650**
%	***67%***	***40%***	***37%***	***43%***
Personnel costs	-350	-350	-350	-350
Indirect costs	-50	-50	-50	-50
Labor cost to projects based on hourly rate	*0*	*400*	*450*	*350*
Indirect delivery costs total	**-400**	**0**	**50**	**-50**
Gross margin	**600**	**600**	**600**	**600**
%	***40%***	***40%***	***40%***	***40%***

Project costs refer to direct costs excluding labor, this is for instance material costs, external services, freight costs, project related meetings etc. Labor cost to project is allocated based on the predefined hourly rate by multiplying the amount of project hours times the hourly rate. The actual personnel cost is then below the sales margin with indirect costs including for instance general equipment and rental costs that are not project specific costs. Additionally as part of the indirect delivery costs there is the credit booking for the labor costs transferred to projects.

As we can see in the calculation the project margin varies between 37% and 67% depending on the amount of hours booked to project and on the defined hourly rate. However, the gross margin remains the same. In the first case there are no allocations at all but only directly project related costs are booked to project and everything else including labor is classified as indirect delivery costs. This idea is supported by the fact that in the short-term also project related labor can be seen as fixed cost item for the company. However, to be able to compare the projects, the project margin should also reflect the amount of labor needed. Thus in the second case all the indirect delivery costs are allocated to the costs. In practice to have the net indirect delivery costs in zero would mean that the company has used actual costing for hourly rate. However, in this case the assumption was that hourly rate is based on the standard costing. This means that in the

example the estimated level of hours and costs is matching with the actual and no excess capacity is left in indirect delivery costs.

In practice the net indirect delivery costs will not result to zero in standard costing as standard rates are always based on assumptions. Hence the closer to zero the actuals result, the more accurate the assumptions have been. In general the variance consists on one hand of inaccurate estimate of cost basis and on the other of inaccurate estimate of hours booked to projects. This can be demonstrated for instance by presenting the challenge of defining the standard amount of hours. The starting point is naturally the defined working time. However, it must be considered that employees will have holidays, sick leaves, common tasks that are not booked to projects, empty slots in their calendar between the projects and so on. On the other hand especially in the short run the maximum hour amount can be neither set as employees may work overtime or there may be additional employees to help during the busy times. The variance resulting from exceeding or falling below the estimated standard amount is presented in overabsorption and underabsorption cases.

In the third case the sales margin goes lower than the gross margin. This is because the utilization rate of labor has been higher than estimated. However, the hourly rate is standard so more labor costs have been transferred to projects than there are actual indirect delivery costs. This situation is called overabsorption. Similarly there may be underabsorption as there is less labor needed or used than is available. In this case the sales margin seems higher as with less labor hours there is the same revenue recognized. However, the cost of excess capacity is also for the company to cover and thus the gross margin remains unchanged.

Hourly rate is also beneficial in make-or-buy problems. When making the decision between own production and outsourcing, it would be natural for the management to choose the option with lower costs (Eden & Ronen 1991). However not to make things too simple, this may be the justification behind the decision in the long-run. On the other hand, in the short-run using external resources over existing own resources may be beneficial for certain project but in the big picture it will double the total costs of the company. This is because in the short-run company's own resources must be handled as fixed costs which will burden the cost structure if used or not. Then if these resources are replaced by external resources, the company needs to carry cost for both own and external resources.

It can be also shown with the help of calculations in table 2, how the use of subcontractors may distort the profitability calculations. When comparing directly the hourly rate of the subcontractor with the hourly rate of internal labor, the internal hour may be more expensive and thus project manager would prefer using subcontractors. However, this may lead to the underabsorption as shown in table 2. Project margin rises higher but at the same time net indirect delivery costs increase as subcontractor hours are replacing

internal hours which are neither used in any other project. Another challenge when comparing subcontractors with internal labor is that internal hourly rate often includes certain allocations from facilities, working equipment etc. Also subcontractor rates include allocations but these allocations are covering only the costs of subcontracting company and not the costs of working environment provided by the buying company. Thus subcontractor rates should be compared only with the pure personnel cost which again in many cases is not visible to project managers.

2.5 About relevance of allocated costs

Basic cost accounting problems can be divided to five categories: matching problem, valuation problem, measurement problem, allocation problem and problem of scope (Neilimo & Uusi-Rauva 2012). From the mentioned problems allocation problem and problem of scope are closely related to problemacy around defining the hourly cost basis and hourly rates: which indirect costs are to be included in the hourly rate and which allocation factors to use in directing these costs to labor hours. Also measurement problems are touching the definition of hourly rates as the management for instance makes decisions if the amount of hours and the cost basis are based on actual costs or on estimated costs.

Allocating costs to labor hours and defining the hourly rate is always balancing between the benefits gained from the allocations and on the other hand the resources needed to maintain the allocation system. Challenges related to cost allocation are faced in nearly all the companies and the larger the portion of indirect costs is from the total costs, the more significant role the allocation principles play. Bhimani et al. (2012) define for purposes for cost allocation:

- To provide information for economic decisions
- To motivate managers and employees
- To justify costs or calculate reimbursement
- To measure income and assets for reporting purposes

Similarly there has been lots of discussion about if the indirect costs should be allocated to working hours or if the margin should cover all the indirect costs. Eden and Ronen (1991) list the facts how a company benefits from the information provided by allocating the indirect costs to labor:

- To maintain long-term profitability labor hours should not be sold if the fee is lower than defined hourly rate
- In make-or-buy decisions company should consider contracting out jobs in case subcontractor cost is lower compared to hourly rate
- Different projects and their profits can be compared and prioritized better as allocations are included in hourly cost

However they also state three assumptions that may cause distortion in hourly costs: allocations assume certain utilization rate which may differ between periods, indirect costs vary in proportion to direct working hours and various work stations of the firm are completely interchangeable.

As seen above, allocating costs is not directly beneficial to the company but indirectly through better awareness and reportability of costs. It is to be considered which costs are reasonable to allocate and which are not. At extreme situation it is possible to allocate all the costs to labor hours but for instance Bhimani et al. (2012) raise the question of irrelevance of allocating joint costs. They explain the irrelevance by stating that as the costs are remote enough from the labor hours, there is no more cause-and-effect criterion available and thus all the allocation factors are subject to criticism. Additionally they state that certain costs are irrelevant for decision-making. Also Kain and Rosenzweig (1992) highlight the fact that allocations are needed but not just because allocating indirect costs but to support the decision making process. Especially they highlight the fact that in defining hourly rates attention must be paid to avoiding arbitrary cost allocation. It is a significant problem that indirect costs are allocated on the basis of a factor that is not actually causing them, for instance dividing indirect costs evenly to all the labor hours. If the cost system does not correctly attribute indirect costs in this case to labor hours, the firm might end up competing in segments where scope-related costs exceed the benefits from larger scale production. Also they mention an important point of view to allocations and cost estimation: certain techniques may result to more precise estimates but on the other hand they consume more resources. Thus it is for management to decide, which cost-benefit relation best fits to their needs.

Eden and Ronen (1991) discuss about benefits of pricing methods based on the hourly rate. They write that cost-based pricing has several advantages but at the same time they state that these benefits are useful only under certain circumstances. The company, department or employee type specific hourly rate gives the management a clear message that to maintain the profitability in the long run the firm must not sell hours below the defined hourly rate. Also in case that there is more demand than resources, based on the hourly rate firm should prefer orders with the highest return per working hour. On the other hand the writers show weaknesses in defining the hourly price on cost-basis. When allocating overheads to working hours, always an assumption needs to be made about the utilization rate whereas it cannot be known in advance what will be the actual utilization rate between zero and hundred percent. Additionally when counting the hourly cost base, decisions are needed which costs are allocated to hours and which are not. This is problematic, as not all the indirect costs vary in proportion to the working hours. With simple calculations the writers show that preferring orders based only on hourly rate, a company easily makes suboptimal decision. However, it can be made questionable, if there is a better way to support hourly pricing or if the solution is only to be aware the possible biases when calculating the hourly rate.

3. PRICING THEORIES IN DECISION-MAKING PROCESS

Pricing is often seen as a difficult area to measure results, yet getting closer to 'correct' price can have major impact on profitability. High unit sales sound promising but in fact they may refer to too low a price. Hence analyzing income statement as such does not provide the insight to pricing but management should focus on the pricing process and different pricing scenarios. (Dolan 1995.)

The current literature classifies pricing strategies into cost-based, competition-based and customer value -based approaches based upon whether firms primarily consider costs, competitive price level or data about customer willingness to pay in their price-setting decisions (Liozu et al. 2011). If direct costs per hour are 50 units, allocated indirect costs are 20 units and target margin is 20 units, this gives the target price of 90 units for a labor hour. In theory – market price being 100 units per hour – the company has competitive advantage of 10 units in price. (Neilimo & Uusi-Rauva 2012.) Depending on the used pricing method the selling price should be something between target price of 90 and market price of 100 or then something else based on customer-value. In the previous chapter the cost basis was defined, in this chapter it is discussed how the knowledge about the cost basis should be applied in making the pricing decisions.

3.1 General pricing theories

Price setting is an important variable for success factors such as enhanced market share, desired product image and signaling of product quality (Guerreiro et al. 2012). Thus pricing is increasingly seen as key lever for improving profitability. In the industrial markets there are three main approaches to pricing: cost-based pricing, competition-based pricing and value-based pricing (Hinterhuber 2008). Cost-based and competition-based pricing are dominating in industrial pricing practice even though value-based pricing is considered best by many of marketing scholars (Liozu et al. 2011). It is widely noted in the literature that cost information can play a key role in determining selling prices, especially in organizations with some discretion in price setting or with highly customized products. On the other hand in many cases the prices are viewed as a function of market forces, either in highly competed markets or in markets with dominant market leader. (Guilding et al. 2005.)

3.1.1 Focus on cost structure: Cost-plus pricing

Companies generally price labor hours to exceed the costs of offering them. The cost-based approach to pricing starts by asking what it costs us to provide the labor hour and hence what price should be charged that desired profit is achieved. As can be seen in the calculation below, price is first calculated on the basis of the costs and mark-up representing a reasonable return is added on top of the cost basis.

Direct labor cost	50	
Indirect labor cost	30	
Hourly rate		**80**
Desired margin 30 %	34	
Hourly price		**114**

In general the desired margin is then modified based on the customers' reaction and on the competitors' price level. (Bhimani et al. 2012.) Guerreiro et al. (2012) also mention that in cost-plus approach based on variable costs there can be seen underlying features of competition-based approach and of value-based approach. Desired margin can reflect not only indirect costs but also input from competitors and from customers in price setting.

Recent surveys report a widespread usage of cost-plus pricing. Fabiani et al. (2005) also support the view that mark-up pricing is the dominant price setting practice adopted by firms in euro area. Mark-up pricing was dominant pricing method in 54% of the companies in their study. Additionally the lower the level of competition was, the more frequently the mark-up pricing was used. On the other hand, Hinterhuber (2008) presents that 37% of companies use cost-based approach to pricing based on all the published researches between 1983 and 2006. Guilding et al. (2005) state that in large companies in Australia and in the UK the cost information is widely considered as important factor in price setting but still many companies use the cost-plus pricing only for a small subset of their products. This may be one explanation why the percentages differ that much between Fabiani et al. (2005) and Hinterhuber (2008) studies.

Cost-based approach is based on the concept that resources used are calculated and the profit is payment for doing the work at that cost. One reason to popularity of cost-based strategy is that the method is easy to implement and to manage. The data needed to set prices is available and easy to find (Hinterhuber & Liozu 2012). On the other hand, cost-based pricing is subject to problems associated with cost allocation and unit cost determination. One significant risk related to cost-based pricing strategies is to end up to sub-optimal profitability. (Liozu et al. 2011.) In case pricing is solely base on costs,

the cost allocation practices are playing a major role in price-setting process and most likely certain departments or products will benefit whereas others will suffer. For instance in automobile industry some problems occur when firms make decisions on the basis of per unit estimates that include allocation of non-allocable fixed costs (Kain & Rosenzweig 1992).

Eden & Ronen (1991) also remind that portion of indirect costs is continuously growing in relation to direct costs. This provides more and more challenges to allocate them without any biases. For instance each department or each employee is not utilizing the same amount of indirect costs, which may easily lead to situation that cost basis for more complicated functions is too low and correspondingly hourly cost for basic hours is too low. The challenge is thus already in allocation principles but combined with cost-plus pricing the more specialized labor hours are sold with too low a price whereas the price for basic hours is not as competitive as it might be.

According to Hinterhuber & Liozu (2012) the main weakness of cost-based pricing is that aspect related to demand and competitions are ignored. Additionally method is quite stiff to react to the changes on the market as cost-plus per hour remains the same independent of the total demand. This is because quite often the allocated costs are defined based on budgeted or normal capacity which may differ from actual capacity utilized. (Guerreiro et al. 2012.) On the other hand neither would using practical capacity provide a perfect solution as cost basis and in this case also price would increase as the demand is decreasing. This may be the solution in certain situations to cover all the indirect costs with decreasing demand but on the other hand higher price may decrease the demand even more. It is stated that especially prices based on total costing are inadequate to use for decision-making about individual products profitability. In the worst case the one project ongoing may need to carry all the indirect costs of the company. The project margin suffers significantly even though in real life the project is carrying the company over the hard times.

3.1.2 Competitors challenging the market-based pricing

The market-based approach uses data on competitive price levels or observed actions of actual and potential competitors as a primary source to determine appropriate price levels (Hinterhuber & Liozu 2012). Hence the pricing process starts with the question, given how competitors will react to the price setting, what price should be charged. As in cost-based pricing the underlying idea is that price equals cost plus profit, in market-based approach price is related to the quality of product (Kain & Rosenzweig, 1992). As the management has the knowledge about the general market price level, they need to make the decision if the price is used as such or if for instance a quality statement or some other targets are to be communicated and achieved with the price level.

Market-based approach is very logical in very competitive markets where products or services provided are very similar to those provided by others. Below there is a simple example, how hourly price is defined using market-based approach with the assumption that the company increases the amount of hours available on the market.

Current market price	130	
Market reaction to capacity increase	-10	
Hourly price		**120**
Hourly rate		-80
Margin per hour		**40**

In market-based price setting it is vital to collect market information, not only what is the competitors' price level but information is needed also on competitors' financial performance, cost structure, revenue and allocation practices. (Bhimani et al. 2012.) Whereas mark-up pricing is dominant price setting rule for 54% of companies, market-based pricing is the second most common approach to pricing as prices of 27% of euro are companies are shaped by competitors' prices (Fabiani et al. 2005). Hinterhuber (2008) shows slightly different numbers stating that competition oriented approaches are the dominant pricing method with the 44% portion of companies.

One important tool in market-based approach is benchmarking. Benchmarking is defined as a continuous process of measuring product, services or activities against the best level of performance. These best levels of performance can be found either in another part of the own organization or externally in competitor's organization. (Bhimani et al. 2012.) In hourly price setting process benchmarking can be seen as a set of activities with which the hourly rate is compared to competitors' hourly rates. In case certain competitor has significantly lower hourly price, reasons behind this must be analyzed and further used as a target for own actions. Related to benchmarking, Hinterhuber & Liozu (2012) recognize the risk of price war for companies applying market-oriented pricing. They support this argument by stating that companies using market-based pricing see pricing as one of the most important keys for competitive advantage and as an example they mention price wars in US car industry and in US airline industry at the beginning of the 21st century.

As one of the main advantages in market-oriented approach is that competitive situation is taken into account (Hinterhuber & Liozu 2012), it may be also problematic in case that there is no pricing information available from similar kinds of services or in this case prices of labor hours in similar kind of organizations. (Kain & Rosenzweig 1992). In certain cases, competitor-based and value-based approach are handled as two sides of market-based approach (for instance Kain & Rosenzweig 1992) but in this thesis mar-

ket-based approach refers to the competitor-based price setting where as value-based pricing is defined from customer basis. Thus ignoring the demand aspects can be identified as one of the weaknesses in competition-oriented approach (Hinterhuber & Liozu 2012).

3.1.3 Customer oriented value-based pricing

Value-based approach is based on market information but whereas market-based approach is focused on competitors' actions, the value-based approach starts with the customer-point of view. Managers must always examine pricing through the eyes of their customers and understanding their preferences is a core competitive strength. Companies can use customer profiling and targeted pricing to refine product offerings to match individual customer's price sensitivities. Below there is a simple example how the value-based price setting is used.

Customer value to the labor hour	200	
Hourly price		**200**
Hourly rate	-80	
Margin per hour		**120**

As we can see in the calculation the starting point is the estimated price that potential customers will be willing to pay. (Bhimani et al. 2012.) Firms using value-based approach want the price to reflect perceived value and image and they examine price from customer point of view. For instance prices can be set high or low depending on the firm's position relative to competitors and their performance. It is stated that for instance automobile industry represents the value-based pricing as consumers are guiding the price setting on the basis how they perceive the value of the car. (Kain & Rosenzweig 1992.)

When defining value-based pricing, the essential step is to define value in this context. Current academic research defines value as customer maximum willingness to pay or as the cost of the customer's best competitive alternative plus the value of any company-exclusive differentiating features. Also it is stated that companies applying value-based pricing define the concept of customer value in ways that are very much consistent with the academic definition. However, when defining value in more detail, there is discussion about if the value is related only to economic benefits or if the value should be calculated as the sum of all the benefits, including social benefits, service and other benefits as well as for instance risk reduction. (Liozu et al. 2011.)

Customer value-oriented pricing is driven by deep understanding about the customer needs. Also the main advantage of this approach is the direct link to the customers and

their willingness to pay. On the other hand also the major disadvantage is related to the customer link as data from customer preferences is often hard to find and interpret. In order to effectively utilize the advantages of value-based pricing, company needs to have a good understanding of their customers' business, their customers cost structure and their customers' alternatives. (Hinterhuber & Liozu 2012.) Ingenbleek et al. (2007) support this view by stating that managerial attention for value-informed pricing is on the rise and this is the result of the deployment of informational resources such as market research, closer relationships with customers and internal knowledge on customers.

Value-based pricing strategy is often used where the value to the customer is high compared to the cost basis. Hence value-based pricing is also facing the risk that the approach leads to relatively high prices. This may seem with high margins coming in but from market entry point of view and from competitor point of view this is a challenge for value-based pricing. The price may reflect the value of the new product but it is important to note that customers do not immediately recognize the value and hence the demand may suffer from the high price especially at the beginning of its life cycle. Marketing department has an important role in communicating the value of new products to customers that they are willing to pay accordingly. From competitors point of view the high price may attract them to provide similar products at slightly lower price which again leads to the situation that the marketing department needs to contribute in justifying the high price. (Hinterhuber & Liozu 2012.)

In the study of Fabiani et al (2005) the value based pricing fall into category of other price setting rules covering 18% of companies. Researchers suggest that also for instance strict regulatory framework may explain companies ending up to this category. Thus the value-based approach is still significantly less used than cost-based and market-based approaches. Hinterhuber (2008) separates the value-based approach from other approaches and comes to result that 17% of companies use value oriented pricing whereas other approaches cover just 3% of the companies. He also supports the view that value-based strategy is superior to other pricing strategies but at the same time he identifies five major obstacles to implementation of value-based approach: difficulties in making value assessment, difficulties in communicating the value, difficulties with market segmentation, difficulties with sales force management and difficulties with senior management support.

Hence even though benefits of value-based pricing are agreed in many discussions, practice is not that widely used. Liozu et al. (2011) are presenting similar reasons behind the low share of value-based pricing as Hinterhuber (2008), one significant reason being the lack of understanding the concept. Especially in the companies not applying value-based approach, the conceptualization of value-based pricing varies from firm to firm as well as within firms. Value-based pricing is often confused with other concepts, like added-value and total cost of ownership programs. The researchers interviewed 44 managers in small and medium-sized US industrial firms and 57% of manager's had a

sound understanding about value-based pricing. The amount was 43% when excluding companies already applying value-based approach. Thus the conclusion was that lack of knowledge is just one reason not to implement the value-based practices. Other reasons may include for instance lack of capabilities, lack of organizational resources or lack of top management sponsorship. It must also be considered that in certain situations, cost-based or market-based approach may be a better fit for the company when summing up benefits and challenges of value-based approach.

Ingenbleck et al (2007) state that managerial attention to value-informed pricing increased as the pricing pressure increased. Similarly Piercy et al (2010) write that during the downturn companies are encouraged to use the price setting as a tool to maintain their sales volume or at least to protect their market share. In the next line they state that cutting prices is not the only option and traditional cost-based and market-based approaches may lead to nonoptimal results whereas other pricing strategies, especially value-based pricing would lead to desirable position in the market and to higher prices.

3.1.4 Other pricing theories

In addition to the three main approached to pricing presented in the previous chapters, there are also many other ways to define the price level, many of which are applied and combined from the three main approaches. Companies may for instance reduce prices to attract new customers, to increase usage rates among existing customers, to discourage customers from switching to competitors and to support sales in other product lines. Price reduction may help companies to achieve these targets but price cuts may also confuse customers and invite aggressive responses from customers. (Kain & Rosenzweig 1992.) The list of pricing methods applied from the main approaches can be continued for instance with floor pricing in which prices just cover the costs, with penetration pricing in which the firm prices low relative to the average prices of major competitors and price leadership where acts as price maker with other firms following. (Kain & Rosenzweig 1992.)

Eden & Ronen (1991) also discuss about the floor pricing related strategy by stating that if the firm is or is forecasted to be in a state of under-employment, the project should be taken irrespective of the hourly rate. In this sense the marginal revenue is the hourly price and the marginal cost is zero as the labor force and indirect costs are already sunken costs even though they are currently unutilized. From purely mathematical point of view the statement is true, as the marginal revenue is higher than the marginal cost. However, from business point of view, there is also many other issues for the management to think about before they start temporarily increasing the utilization rate by approving orders with low margins. For instance customers may get used to lower prices and in the future it may be challenging to argue for the higher hourly rate. Also committing hours to low-margin-projects may be risky in case there are project opportunities with higher margins which the company then has no resources to deliver because of the

low-margin-projects. Thus management always needs to decide if they prefer maintaining excess capacity or not. (Eden & Ronen 1991.) In general, for all of the traditional and the applied strategic pricing methods, the management must be aware about the market situation, their own cost basis and all the non-financial factors such as excess capacity or risk to suboptimal costing to be able to make profitable decisions.

Price discrimination and pricing to market are also common practices in euro area. Price discrimination refers to selling the same product at different prices either to the same customer or to different customers instead of charging a uniform price in order to maximize the profit. Price discrimination may take many forms and it can be based for instance on the type of the customer, on the geographical area, on the number on units purchased or on the specific time the product is sold. In the euro area the percentage of customers setting their prices is as high as 80%. In trade sector price discrimination is at relatively low level where as case-by-case pricing is highest in manufacturing sector. (Fabiani et al. 2005.)

Pricing to market is quite close to price discrimination but the reasoning is slightly different. Whereas in price discrimination the firm is purely aiming at profit maximization, in pricing to market the argument for different prices in different market areas is about the transaction or arbitrage costs between different geographical markets. According to Fabiani et al. (2005) in euro area about 50% of the exporting firms apply pricing to market and the share is even higher when discussing about companies selling outside the euro area. Transportation costs and competitors' prices on the foreign market area the most relevant factors for pricing to market. From pricing to market point of view, firm's size is not a relevant factor.

3.2 Pricing process utilizing pricing theories

Following certain pricing theory and utilizing pricing as a strategic item is one thing whereas pricing process is another issue. Dolan (1995) stated that to improve company's pricing capability managers should begin by focusing on the process, not the outcome. He presented an eight-step process to better pricing: first the company should assess the value that customers place on the product, then to analyze the variation in valuation between customers, to estimate the customers' price sensitiveness, to identify the cost structure and to consider competitors' reactions, followed by monitoring realized prices and by assessing customers' emotional responses and finally to analyze whether the returns and margin are adequate. Fabiani et al. (2005) collected evidence from more than 11,000 firms in euro area to provide understanding about the pricing behavior in practice. Survey was conducted in nine euro area countries (Austria, Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Portugal and Spain) which in 2005 covered about 94% of euro area gross domestic product. The results support the idea that the mark-up pricing is the dominant price setting practice adopted but

in addition the study gives insight to the price adjustments as a two-step process. First there is the review stage and then the implementation stage.

3.2.1 Reviewing and changing price

In review stage firms evaluate the price they want to set taking into account the current pricing situation and all the information that the management has available. Fabiani et al. (2005) summarize the main features of the first stage of the price adjustment process to three statements. Firstly around one-third of the companies are using mainly time-dependent pricing rules while the remaining two-thirds are including also certain elements from state-dependent pricing in their process. Secondly around half of the firms review their prices taking into account a wide range of information including both past, current and expected economic developments whereas the other half is adopting a backward looking-behavior or using just rules-of-thumb in their decision making. Thirdly the writers state that in general firms review their prices one to three times a year.

Time-dependent pricing refers to periodical price reviews and the timing of the review is not dependent on the state of the economy. On the other hand firms following state-dependent pricing review their prices as there is a large enough shock on the market independent on the fact when the previous review was done. In euro area 34% of firms follow purely time-dependent rules while the remaining two-thirds use pricing-rules with some elements of state-dependent approach. (Fabiani et al. 2005.) This result is in line with the results from US markets where 40% of companies undertake meaningful periodic price reviews (Blinder et al. 1998) and results from Swedish markets where 23% of firms use time-dependent approach (Apel et al. 2005). On the other Hall et al. (2000) state that in UK market 79% of firms are time-dependent. This may show that there are significant differences in the market areas or on the other hand there may be differences in categorizing if a firm is purely time-dependent or if it is following both time-dependent and state-dependent approaches.

Information set used in price reviews can be scaled from optimal to non-optimal so that in optimal case the information set includes both past and present context and also expectations from future conditions and at the other end firms are using just rules-of-thumb. According to Fabiani et al. (2005) about 48% of companies in euro area include future expectations in their price review, 34% of firms base their review on historical data and the remaining 18% only use rules-of-thumb in their pricing review which in this case refers for instance to utilizing just consumer price index or a fixed percentage in changing the prices. Results also indicate that large companies tend to pay more attention to future expectation whereas small and medium companies are more backward-looking.

Large firms also review their prices more frequently than smaller ones. Amirault et al. (2004) got into same result and they argue that one reason behind this may be that management in smaller entities has numerous other tasks as well which increases the managerial costs associated with pricing reviews. In addition to the size of the company, also the degree of competition and the business sector may have effect on the frequency of price reviews. Fabiani et al. (2005) state that firms facing higher competitive pressures review their prices more often in seven out of nine countries in their study. Related to business sectors, firms in the trade sector review their prices more often whereas service firms review their prices less frequently than firms in the other sectors.

In case the reviewing stage provides information that the prices should be adjusted, it is then for the management to decide if the price adjustment is implemented or not. Fabiani et al. (2005) state that price changes are less frequent than price reviews. Whereas the number of price reviews changes in the range of one to three times per year, the average firm changes it price once a year in Europe (Fabiani et al. 2005). This is aligned with the study from Dhyne et al. (2006) where the consumer price data for euro are was reviewed resulting the average duration of certain price to be four to five quarters. On the other hand according to their study, the price changes in US take place twice as often as in Europe, that is the certain price would remain only two or three quarters. Also Blinder et al. (1998) provide similar study from US markets. The results give the same idea as the frequency is slightly higher than in Europe with average of 1.4 changes per year. Trade sector is more flexible in terms of price changes whereas price changes in service sector are less frequent. Also the strong competitive pressure is related to more frequent price changes. There are several reasons for this price stickiness, that is prices are changed less frequently than they are reviewed. It may be that the price review ends up to result that there is no reason to change prices but there are also several other reasons identified. (Fabiani et al. 2005.)

3.2.2 Factors behind implementing price change

Vermeulen et al. (2007) listed factors behind price changes which the management then analyses if the change in underlying factor is significant enough for a price change. They start with the changes in cost structure and provide evidence that certain cost structure exposes products to price changes. Especially higher share of labor costs corresponds with lower frequency of price changes. Inflation and competition are the next two factors listed behind price changes before seasonality and attractive pricing. Seasonality may be related to the seasonality in underlying costs but it may also be about implicit and explicit contracts as described in the following paragraph. Attractive pricing is preferably a factor behind price stickiness, however, it is an important factor in pricing as it is studied that the share of attractive prices varies between 19% and 43% on the Italian, Spanish and German producer markets (Stahl 2006, Álvarez et al. 2005, Sabbatini et al. 2005). Sixth category is a combined other sources for price changes in-

cluding mainly state related factors, for instance regulated prices, required bureaucracy and in VAT and other taxation.

Fabiani et al. (2005) state that implicit and explicit contracts are the most relevant explanations for sticky prices but in total they list ten most relevant theories behind price stickiness.

1. Argument behind cost-based pricing is that if costs do not change, prices will not change either. Thus shocks in market conditions will not cause any price changes. Also demand or cost shocks in production stages only affect prices with certain delay, as there are time lags at each production stage and it takes time before the shock reaches the customer.
2. Explicit contracts refer to long-term agreements between firms and their customers in which firms promise to offer certain product at a specific price. Firms do these to achieve long-term customer relationships to stabilize their sales and on the other hand customers aim at having predictable cost structure in future without having to renegotiate contracts every time.
3. Implicit contracts are closely linked to explicit contracts but in this case there is no agreement between firms and their customers but firms aim at building up long-term contracts by changing their prices as little as possible. Idea that consumers prefer firms who they feel price their products fairly is noticed in many studies (for instance Rotemberg 2005 and Fabiani et al. 2005). This is closely related to implicit contracts as firms are reluctant to update their prices in case customers feel the changes unfair. Okun (1981) states that price increases are more likely viewed fair in case they are linked to cost shocks compared to the price increases related to demand shocks.
4. Co-ordination failure refers to the situation that firms are reluctant to change their prices as they do not know how their competitor's will react. The assumption is that price increase would decrease firm's market share as other firms would hold their price level. On the other hand price decrease would not increase the market share as competitors would follow.
5. Menu costs incur when changed price lists must be updated in all the contexts. For instance price lists must be recreated, prices must be updated to all the systems and they need to be communicated to the customers and all these actions cause costs to the firm.
6. Costly information refers to indirect costs caused by the price changes. In addition to physical menu costs mentioned in above, pricing process requires for instance time from the personnel and may also confuse employees and customers. Ball and Mankiw (1994) even state that the most significant cost in price adjustment consists of time and attention required from the management first to collect the relevant information and then to implement the price changes.

7. In some cases firms may see the changes as temporary shocks and thus decide not to update prices. It is not relevant if the shock is temporary or not but the vital issue is how the management assesses the duration of the shock.
8. Price changes can be replaced also by changing some other features of the product. As firms assume price changes have negative effect on their sales, they can modify for instance the delivery time, the level of the service or the quality of the product.
9. The idea that customers define the quality based on the price may also reduce price changes, especially price reductions.
10. Setting psychologically attractive prices reduces price changes as the price changes are postponed until the next attractive price is relevant. For instance as the price is set to 9.90 more likely the next change is to 8.90 than to 9.70 or to 9.30. Or as the price of coffee is in 1.00 the increase to 1.50 is much more likely than to 1.15 or 1.30.

As mentioned, according to Fabiani et al. (2005) implicit and explicit contracts are the most relevant explanation for sticky prices which supports the idea that firms respect the customers' preference to stable prices. Next most relevant theories were cost-based pricing and co-ordination failure which is supported by Amirault (2004) and Blinder et al. (1998) who rank these as most significant reasons for price stickiness. Zbaracki et al (2004) also show similar results as they conclude that one quarter of costs related to price changes is about menu and information costs and the remaining three quarters are about customer dislike to price changes.

Fabiani et al. (2005) also make the observation that firms adjust their prices asymmetrically in response to shocks depending on the source of the shock and the direction of the adjustment. Price increases are often related to increase in costs whereas decrease in costs does not affect prices that often. On the other hand changes in market conditions, that is in demand and in competitors' prices, are the main factor behind price reductions. Peltzman (2000) provides similar evidence that on average management responses faster and more significantly to cost increases compared to cost decreases. This is also in line with the theory related to implicit contracts. From customer's point of view price increase related to cost shock is fair whereas price increase related to demand shock is unfair so firms prefer cost shock related price increases. (Okun 1981.) Additionally firms in highly competitive markets are more likely to respond to changes in underlying factors, especially in the case of demand shocks (Fabiani et al. 2005).

So there are differences how firms react to changes in costs or in market conditions or if they react at all. Additionally the amount of price increases and price decreases is not equal. According to Dhyne et al. (2006) 40% of price changes in euro area are price decreases whereas Klenow and Kryvtsov (2004) report similar findings in US markets stating that 45% of price changes are price reductions. Also Vermeulen et al. (2007) come to result that price reductions are not a clear minority but around 45% of price

changes in euro are price reductions. Also they state that price reductions are roughly as sizeable as price increases whereas both are significantly higher than inflation rate.

Vermeulen et al. (2007) also state that the industry has significant effect on the frequency of price changes. They state that industries can be classified to three categories in terms of price adjustments: price changes are very frequent in energy sector, relatively frequent for food and intermediate products and infrequent for capital products and durable products. The ranking of industries is similar between the countries. One more observation that Vermeulen et al. (2007) make is that prices at the PPI (purchase price index) are more flexible compared to CPI (customer price index) so they conclude that retail level increases the stickiness in the prices.

3.2.3 Theory of locked-in costs in defining hourly rate

Locked-in costs and sales refer to costs that have not yet been incurred but that will be incurred in the future on the basis of decisions that have been made whereas cost and sales incur when the resource is used and sales recognized (Bhimani et al. 2012). The problem here is that especially sales are locked in already at the beginning of the project but possible downturns and cost increases only occur during the project thus affecting the hourly cost basis and further the project profitability.

In general the sales price of labor hours is locked-in after the contract is sealed. Labor hours are one element in the delivery project and the revenue from labor hours is included in the total price of the project. Also major amount of costs related to labor hours are locked in already at the beginning of the project as the company has the plan which resources it will use to deliver the project. However, there are also several costs with variance during the project duration.

This is visualized in figure 5. This thesis is about the hourly price so it is assumed that the amount of labor hours remains on the estimated level and additionally the hour split is even throughout the project duration which would mean that with fixed hourly rate also the costs would be recognized evenly and the estimated total cost would remain on the same level through the project. However, as we see in the figure 5, the costs do not incur evenly and thus also the estimated margin varies over time.

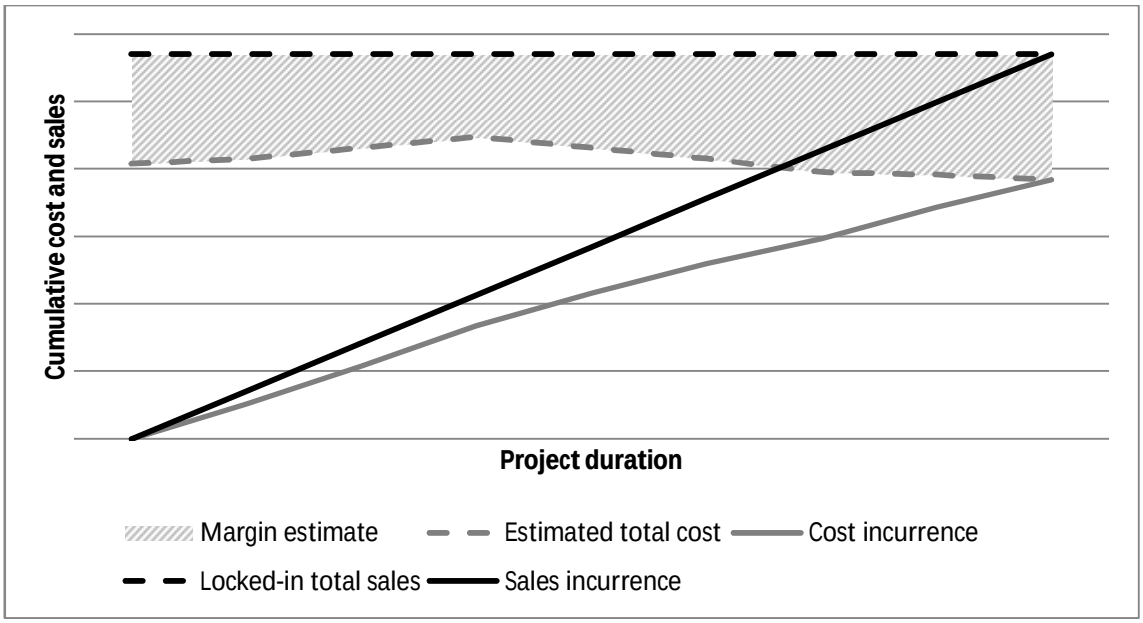

Figure 5. *Incurrence of costs and sales from labor hours in delivery project (applying Bhimani et al.2012)*

As we can see in the figure, the estimated total margin is first decreasing but as the project progresses the actual cost incurrence slows down and the estimated total margin enhances. As the assumption was that the amount of hours is fixed, the reason for margin changes must be in the hourly rate. At the beginning the project has used resources with higher hourly rate than planned whereas in the latter part of the project the cost per hour has been lower and thus the margin has increased.

This view supports the importance of the correct hourly rate, as the amount and the price of hours is mainly locked-in already when the project is sold and thus the margin is dependent on the hourly rate used in actuals. Aligning estimates and actual results is challenging especially in terms of long projects. It must be considered already when working on the offer, how the assumptions about the inflation and other price increases are included in the price. If the estimate is done with current hourly rates, especially the significant increase in hourly rate would have a severe impact on project margin. Hence again, the visibility and understanding to hourly rates and hourly prices would solve many issues related to locked-in sales and costs as the expected cost changes would be built-in already in estimates.

3.2.4 Other factors affecting the actual pricing process

One more essential factor affecting the pricing process is the transparency of both the hourly rate and the hourly price. Cost estimates and further pricing methods have a significant effect on the decision making process in companies. For instance projects are authorized to start or to continue based on costs and margin and similarly the amount of resources allocated to projects is widely dependent on the margin between cost basis

and the price. (Kain & Rosenzweig 1992.) Hence the transparency to the costs and prices would support systematic decision making principles and also decrease gaming related issues. The trend in companies is moving towards more transparent pricing process which in its broadest sense refers to the situation where the selling party is sharing its cost-related information with the customer (Singh 2015). Earlier it was mentioned that companies aim at prices that customers feel fair and disclosing cost information with the customers is a tool for customers to evaluate the fairness of prices. On one hand transparency may enable companies to charge extra for supporting certain values like ethical or environmental issues or as well for providing high quality labor instead of using for instance cheap labor with lower expertize level. On the other hand companies may suffer from the transparency in case customers feel the pricing is unfair and there is no clear reason for high margins. (Singh 2015.)

In large companies the transparency issue can be seen between the company and the customers but also between the internal departments of the company. Simintiras et al (2015) argue that transparency to costs and prices would motivate companies towards the more efficient resource utilization. This is because transparency would reduce the information asymmetry by showing what is behind the price and thus allowing the external customers to better assess the price level and the internal stakeholders to better evaluate the cost structure. In the study it is also stated that this way cost transparency would make companies more sensitive to both cost and pricing aspects in their market offerings. Singh (2015) supports this argument by saying that transparency in price would enhance companies' operational efficiency by demanding companies to justify their prices, to differentiate and to innovate and to serve the niches instead of just competing on price.

There are also arguments against the transparency in pricing. Gerdeman (2014) lists certain facts that makes companies reluctant to disclose their cost structure or even makes it impossible. Companies may not want to share their production costs as the cost structure may be one basis for their competitive advantage. Also contracts with suppliers or customers may prevent making certain information public. Additionally it may be the case that the company just does not have the pricing information available in the needed format. For instance there may be several manufacturing processes or manufacturers for certain product or the cost structure may be changed often or something else which makes it difficult to provide the information.

Gerdeman (2014) also states that cost structure is one of the things that has been thought as a taboo between companies and their customers. However, by providing the information about the cost structure to the customer, companies may engage their customer better and reach more meaningful dialogue with them. Mohan et al. (2014) argue similarly by saying that transparency leads to higher brand loyalty and higher sales as sharing the information enhances the quality of the relationship. But again the study reveals the fact that the higher profit margins are made transparent the weaker the effect is. And

finally as the profit margin turns out to be higher than competitors, the transparency backfires and has negative effect on sales.

The fact that firm's costs are often tightly guarded secrets (Mohan et al. 2014) is the obstacle for transparency in pricing but similar benefits as in external transparency can be seen in enhancing the internal transparency. Dolan (1995) describes how different departments support the pricing process: accounting department provides the cost estimate, marketing department provides the pricing strategy, sales department provides the customer specific details, production sets manufacturing and supply related limits whereas finance department controls the requirements for the entire company's financial health and so on. Input from each of the department is required but problems arise as there is no clear process to coordinate the inputs and no transparency to inputs from different departments. For instance marketing department provides list prices which sales force then uses in the negotiations with the customer. Sales force provides certain discounts to the customer and after this legal department reviews and possibly adjusts the prices to prevent the violation of laws and contractual agreements. Additionally there are certain clauses in the contract about delivery terms which are then considered for instance if there is a risk that the delivery will be delayed. Each department aims at the optimal solution from their point of view but in the big picture the decision may be suboptimal and the final price and margin may differ significantly from the level that was intended at the beginning. Additionally transparency and documentation already at the beginning would decrease the effort needed for instance when certain ground facts need to be changed in pricing process. For instance if the accounting just provides the cost basis with no details or background, it is impossible for other departments to analyze, how the changes in basic assumptions would affect the cost basis. Dysert (2005) describes this issue by writing that in many cases the conceptual estimate may have been very accurate, but it was just for a different project that ended up being constructed.

Another fact that management should consider in pricing process is how the external price relates to transfer pricing. Transfer pricing refers to the price that one subunit of an organization charges for a commodity supplied to another subunit of the same organization (Bhimani et al. 2012). Transfer pricing is part of the internal pricing process, for instance the hourly rate used when labor hours are invoiced between subsidiaries so it does not provide direct competitive advantage to the company, so it should not be highlighted too much. However, transfer pricing is essential part of tax management and tax authorities have set certain requirements for adequate transfer price. As neither the selected transfer price nor defined hourly rate directly bring any revenue or margin to the company, it would be beneficial to define the hourly rate so that also tax authorities will approve it. Hence only one hourly rate would be utilized and no extra work would be needed to calculate it separately for accounting purposes and for taxation purposes. Transparency to the hourly rate would also solve the issues if certain entities or func-

tions feel the hourly rate to be too high or too low. For instance tax management may require some internal margins to be included in the hourly rate but as the cost structure is transparent, the one calculating the external prices is aware of this and thus he can adjust the prices to include the needed total margin.

3.3 Pros and cons of different pricing methods

Kain & Rosenzweig (1992) review the costing and pricing practices in four industries and come to conclusion that characteristics from the main approaches are utilized in all the businesses. Companies use information from competitors and customers but at the same time an accurate costing system is needed in order to determine how low prices can be set before profits start to suffer. The appropriate price depends for instance on the nature of market, competition and the wanted product image.

The writers also list four components of effective pricing: objectives, strategy, structure and related tactics. When defining and combining their pricing model between the main approaches, the management should consider these dimensions. Objectives should be quantifiable and measurable in order to be useful and strategy deals with issues, how pricing will be used to accomplish the objectives. For instance achieving target return on investment supports cost-based pricing, increasing market share and discouraging competitors refer to market-based pricing and value-based approach may be seen in the background when the target is to maximize profits. (Kain & Rosenzweig 1992.)

Third dimension, the structure refers to the fact, how the various labor hours are priced, how prices will vary for instance among customers, projects and market areas whereas the fourth component concerns for instance the determination of acceptable price ranges. (Kain & Rosenzweig 1992.) When applying these components to hourly rates, it is important to analyze, if there should be for instance different price categories for senior and junior engineering hours and on the other hand to hours for project management and other functions. The structure of pricing should support the targets of the company, for instance the highest margin should be included in the hours that are the core business of the company and on the other hand additional services might be priced at lower level so that customer would include also these hours to their order. Acceptable price range is useful for instance for sales and market personnel as they need to have the knowledge what kind of discounts they can grant or if they can grant some volume discounts.

Certain characteristics of different pricing methods are suitable for certain companies whereas other companies may benefit from another pricing method. For instance companies can be classified as price-makers and price-takers. Price-makers tend to be market leaders or companies with highly customized products whereas price-takers are often smaller companies with standard products. For both types of companies it is important to define the target margin but the way of earning this margin is different. Price-

taker is involved in price establishment so market-based pricing is not applicable as there is no relevant market-price available. Thus price setting must be based on cost structure or alternatively on customer value. On the other hand price takers do not have that much power in price setting so for them it is natural to use market-based pricing. Thus these companies are not using the target margin to define their price but rather to calculate the target level for costs to maintain cost competitiveness. (Guerreiro et al. 2012.)

As discussed above, pricing decision always include some characteristics from more than one pricing method, and the final price setting results from many issues considered. However, each pricing method has its benefits for certain pricing situations whereas each pricing method also has challenges in some other pricing situations. Additionally the pricing methods and pricing process in practice are strongly interacting with each other. The characteristics and the linkages to pricing process for the three main pricing methods are summarized in the table 3.

Table 3. *Features of the three main pricing methods*

	Advantages	Risks	Process linkages
Cost-based mark-up pricing	-Data readily available -No reference data needed -Simple to utilize -Controllability	-Customer approach not taken into account -Competition not taken into account -Sensitive to suboptimal pricing -Allocation biases effecting directly the prices -No external pressure to optimize the cost structure	-Time-dependent pricing -Currently dominant with market-based approach -Utilized by companies as price makers
Competitor -based market pricing	-Competitive situation considered -Relatively easy to collect data -Reacts to market shocks -Allocation biases not directly in prices -Directly usable as transfer price -Market price indicates the needed cost structure	-Demand and customer approach not taken into account -No market price for unique products -Risk of price war	-State-dependent pricing rules -Used in competitive markets and when the level of price discrimination is low -Benchmarking generally used -Currently dominant with cost-based pricing -Understanding from cost basis needed
Customer -based value pricing	-Customer value analyzed -Direct link to customer needs -Optimal for profit maximization -Allocation biases not in prices -Wider contact with customer needed	-Data difficult to collect and to interpret -Value must be communicated to customers -Lack of capabilities in the organization -May end up to relatively high prices -Resources required for wider contact with customer	-Use of value-based pricing in increasing trend -Expected economic value included in analysis -Understanding from cost basis and from market situation required

Basic pricing methods can be divided to these three categories but in practice companies are combining aspects from all of these approaches. Additionally the company's position on the market affects the way it approaches the costing. For instance in the competitive market situation the market-oriented approach is often dominant but Noble & Gruca (1999) state that companies apply the method differently. For instance firms with high cost basis choose parity costing meaning that they take the price from the market and on the other hand firms currently having low utilization rate choose supplier pricing meaning that they set their prices below the market price to increase volumes.

Noble & Gruca (1999) also present few forms of strategic pricing where the similar ideas have been utilized in pricing as in basic approaches but additionally pricing is used as a strategic tool. For instance new products are often sold with low prices to increase the market share or with originally high price reducing over time to maximize profits at the beginning but to maintain volumes over the life cycle. Bundle pricing refers to selling many products combined with lower price compared to product-specific prices and in complementary product pricing the core product is priced low as the higher margin is included in supplementary products.

Irrespective of the pricing approach, it is vital to document the assumptions and used methods behind bot the hourly rate and the hourly price. Dysert (2005) highlights that documentation is important from the first estimation drafts to the final report of delivered project. This way the assumptions can be reviewed as the estimation phase and pricing negotiations get further. Additionally with the proper documentation the organization may learn from delivered projects especially in case the estimates varied significantly from the actual results. Additionally the management must always consider also the steering effect of different approaches. It is well-known fact that what gets measured, gets done (for example Kaplan & Norton 1992) and also defining hourly rate and hourly price guides employees towards certain practices and similarly prefers certain project with certain content over other projects.

4. PRICING PRACTICES IN [COMPANY X]

As [Company X] is estimating project costs, the calculation includes estimation of labor hours split by category and by on-shore and off-shore hours and estimation of hourly prices used. This chapter is about understanding the hourly prices and the hourly rate; how the hourly price is defined, what is included in the hourly price and in hourly rate, how using hours from different locations within the company or alternatively subcontractor hours affect the margin etc. Additionally it is interesting to compare how pricing methods are used in practice in relation to the theoretical background as there is always a gap between the theory and practice (Lucas & Rafferty 2008).

4.1 Data collection and data analysis

Data for this thesis was collected based on observations, discussions, interviews and documents as the writer was working in the case company. The topic for this started to get its shape as a project with the topic Proposal and Estimation Alignment was launched. The aim for the project was to go through the current estimation and proposal process at [Company X] and further get all the terms and practices defined and aligned in the different parts and in the different parts of the organization. As the project got started, it was soon realized that labor was one of the significant entries in a project estimation for which there was no aligned documentation existing how different kind of hours should be priced in the proposal.

Reporting and defining the current situation in labor pricing and pointing out the challenges then became the starting point for this thesis. First task was to get familiar with the current situation. As the project started, writer of this thesis had worked in the company for two years in finance & control department so there was already general understanding about hourly rates. However, as the topic was defined, the observing became systematic and related literature was widely used to strengthen the understanding about the theoretical framework. The observer worked in the company for the whole data collection period and at the same time as he took notes he contributed in the project with his expertize.

Significant part of the data about the current situation is based on the notes as the observer attended the weekly project status meetings and took care of his daily tasks and routines. There were also both official discussions in the meetings and unofficial corridor discussions where the hourly rates and prices were either the main topic or at least touched. Additionally the existing documentation, instructions related to hourly rates and enterprise resource planning (ERP) system provided useful data to fulfil the contri-

bution of daily practices. Persons from many locations and many departments were included in these conversations. Mainly there were people from finance & control and proposal management organizations but there was contribution also from business and sales for instance. The discussions mainly took place in the headquarters in Finland but also employees in local subsidiaries were included in certain discussions.

The observer worked as Controller in Corporate Business Control and in Operational Excellence support function. Co-workers in the organization who contributed the most were the Director of Proposal Management, Director of Corporate Business Control and Group Controller. In addition to this the vital view from business point of view was mainly covered by discussing with Business Area Controllers and Region Controllers whereas the topic was approached from more practical point of view in conversations with site controllers and local entity controllers.

As the current situation was documented the main focus moved to analyzing the experienced challenges and to finding solutions to these challenges. At this point case interviews were the main research method and the interviewees were chosen based on the convenience. On one hand the role as an employee gave the observer already a good basis to contact the relevant persons and additionally the first interviewees named further employees who might have good insight to certain issues. Interviews were theme interviews as there were no questions defined in advance but only the topics which were to be covered. Discussion proceeded freely from one point of view to another. Naturally, also the understanding about the current situation became more accurate during these interviews, but the aim was already to understand the challenges and how they can be dealt with. In practice interviews were face-to-face meetings and continued from fifteen minutes to an hour and a half. Numerous interviews were held: with Director of Proposal Management the approach was to define the challenges and most practical solutions from price setting point of view, with Director of Corporate Business Control the main focus was to ensure that the practices used in estimations and proposals would be suitable for budgeting and actuals reporting as well and with Business Area Controllers the idea was to ensure that the business needs are not overlooked.

As the data from current situation and experienced challenges was collected, scenarios were used to provide insight how different pricing models response to the challenges and what is the change from current situation. Four different kinds of jobs were defined and pricing of each of these jobs was modelled by using six different pricing models. The used pricing models are based on the discussions about the alternative solutions to experienced challenges. At the end, the results from the analysis of the challenges and the output from the scenarios were utilized to define proposed main principles for future development of the pricing model at [Company X].The detailed level of pricing model, the implementation of the defined actions and controlling and estimating the performance of the changes were not covered in this project and they are thus subject to further study.

4.2 Current situation

Currently [Company X] is applying the concept of one hourly cost rate per subsidiary. Internal instructions are available how each entity should calculate their hourly rate and the rate is updated on a yearly basis. However, not to have the current situation too simple, certain subsidiaries have defined two or more hourly cost rates based on the employee's cost center or function. In pricing [Company X] then has different approach between delivery and service businesses. In delivery business the pricing is currently based on cost-plus pricing whereas service business has its own hourly rates with tens of price categories for different service roles and tasks and additional charges for instance for overtime or holiday times.

4.2.1 Defining hourly rate

In the table 4 it can be seen that in defining hourly price and further calculating the job cost [Company X] practice is pretty much aligned with the general approach to job costing presented by Bhimani et al (2012). There are only two differences between the general and [Company X] approach. At [Company X the hourly rate is pre-defined already at the beginning of the year and thus based on estimated costs whereas general approach would suggest to calculate the costs based on actual costs and actual labor-hours. However, as there is all the time numerous projects on-going and additionally many of these projects last for many years, it is not reasonable to use the actual data. The other difference is that in [Company X] the cost per hour is pre-defined whereas the general approach suggests that it would be calculated only as the total amount of labor-hours and costs is available. The figures in the table are illustrative only and thus not representing the applied hourly rate in the [Company X].

Table 4. *Current situation at [Company X] in comparison with general approach to job costing (Bhimani et al. 2012)*

Base data			
- Annual working days	240 days		
- Hours per day	7.5 hours		
- Utilization rate (estimate)	80%		
- Hours per year (estimate)		**1,440 hours**	
- Utilization rate (actual)	85%		
- Hours per year (actual)		**1,530 hours**	
- Annual salary average (3,500 per month)	42,000		
- Multiplying factor for fringe and other costs	1.7		
- Annual personnel cost		**71,400 hours**	
- Indirect costs (estimate)		**58,000**	
- Indirect costs (actual)		**55,400**	
		General approach	**Company X**
Hourly rate pre-defined			
- direct costs per hour		-	**50** (= 71,400 / 1440)
- indirect costs per hour		-	**40** (= 58,000 / 1440)
Step1 – identify the job		Project X	Project X
Step2 – calculate direct costs	400 hours	**18,667** (= 400 * 71,400 / 1,530)	**20,000** (= 400 * 50)
Step3 – identify the indirect cost pools	Equipment and support	55,400	-
Step4 – select cost-allocation base	Labor-hours	1,530	-
Step5 – calculate the indirect costs		**14,484** (= 400 * 55,400 / 1,530)	**16,000** (= 400 * 40)
Step6 – calculate total cost basis		**33,150**	**36,00**

At [Company X] calculating the hourly rate is based on estimate about annual labor-hours, about average annual salary and about annual indirect costs. Thus hourly rate of 90 can be pre-defined. In figure 4 the difference between costs is almost 3,000 which comes directly from the difference between estimated and actual costs. Using pre-defined hourly rate, this difference is visible only as part of over or under absorption in the income statement.

In figure 4 [Company X] pre-defined hourly rate is calculated by dividing the annual labor-cost by annual labor hours. Utilization rate for hours is estimated to be 80%. In reality utilization rate is estimated based on the historical data and on the other hand also on the order backlog and the on the market overview which reflect the factor, how much current and coming projects are demanding hours. Additionally indirect cost per hour is calculated by dividing the indirect costs by total labor-hours. Here indirect costs represents the part of total indirect costs that [Company X] has decided to allocate to working hours. Also worth mentioning is that estimate of indirect costs is aligned with budget numbers as the difference between budgeted and estimated costs would cause the situation that there would be over or under absorption built in already at budget numbers.

When specifying the difference of 3,000 between the scenarios, it can be seen that roughly half of it comes from direct costs and the other half from indirect costs. As the scenario with actual costs gives higher total, it means that with [Company X] practice the project has absorber more costs than it should have. The higher direct costs are caused by the fact that in actuals the utilization rate has been five percentage units higher than in estimate and thus direct cost per labor-hour is less. On the other hand the difference between estimated and actual indirect costs directly comes through in indirect cost per hour. In general [Company X] is applying normal costing method to define both direct and indirect costs per labor-hour.

4.2.2 Instructions to cost basis

[Company X] (2013) has provided internal instructions which explain in more detail how the cost basis is defined. The main guiding principle is that under IFRS (International Financial Reporting Standards) the cost basis used should meet the criteria of being recorded under Work in Progress in the balance sheet and consequently such hourly rate can be included to a cost for a delivery project or contract. It is also highlighted in the instructions that the hourly cost basis must not be used as sales price.

In the instructions ([Company X] 2013) direct costs are defined as all the direct labor costs relating to a specific contract. Also costs such as tools and equipment used solely for a specific contract, direct materials, subcontracting costs and contract supervision are defined as direct costs. This is relevant from hourly rate point of view, as these costs should not be allocated but they are invoiced separately from the customer.

Indirect costs are in the instructions ([Company X] 2013) split to attributable and non-allocable costs. Attributable costs are costs relating to the contract activity in general such as costs of indirect labor, quality control and inspection, insurance, repairs and maintenance, depreciation and amortization. On the other hand costs that cannot be allocated to contracts include general administration and selling costs, general finance costs, research and development costs and depreciation on property and equipment that is not used on a particular contract.

With these guidelines the hourly cost basis is defined to include the following items:

- **Payroll cost:** all the personnel costs such as wages and salaries, fringe benefits and bonuses for personnel reported under delivery function; this excludes personnel in other functional areas, that is selling and marketing, administration and research and development.
- **Rents and leases:** all the rental costs that are reported as fixed delivery costs; functional area specific costs are directly booked to correct functional area whereas general rental costs are divided to functional areas based on the headcount.
- **Depreciation of machinery and equipment:** depreciation of IT equipment, property etc. in fixed delivery costs. However, any depreciation of production machinery should not be included in hourly price but these are separately handled.
- **Costs of indirect outside services:** IT services, cleaning etc. reported under fixed delivery costs; as in rental costs, general outside services are divided to functional areas based on the headcount.
- **Travel expenses:** Travel expenses of delivery function which are not specified to certain project; these travel expenses may relate for instance to general management or to training.
- **Other fixed cost of sales:** insurances, license costs etc. in fixed costs of sales.

The hourly cost basis is then calculated as shown in the table 2. Total direct and indirect costs are summed up and divided by labor hours. However, one more factor to be considered is the difference between total amount of hours and total available hours. The hourly price must cover also the non-billable hours such as department management hours, training hours as well as vacations and other absences. Hence the total amount of hours must be deducted by certain estimated percentage. This percentage may naturally differ between locations based on for instance the labor legislation and the structure of the delivery organization. For instance 70% can be used as a directional utilization rate for labor hours.

Additionally it is stated in the instructions ([Company X] 2013) that the hourly cost rate is reviewed annually in the course of the planning process for next year. However, the hourly cost rate should be monitored regularly and it can be revised during the year in

case a major change is needed. Additionally to simplify the project follow-up, forecasting and costing it is mentioned in the instructions that only one hourly cost rate should be used per location. And also hourly prices of subcontractors should be defined to match with these hourly rates. This means that independent of the subcontractors' real hourly rate, the cost for the project should be harmonized to avoid sub-optimization by choosing external resources instead of unutilized own resources.

4.2.3 Current pricing practice

Currently at [Company X] each subunit calculates their hourly rate individually which is then input to the enterprise resource planning (ERP) system. As employees are then booking their labor hours to projects, the hourly rate is used in valuating them and thus transferring costs from employees' home cost centers to projects. Corporate business control department monitors the level of hourly rates that they are in line with the cost structure of each subunit and also that the historical trend is relevant. However, no exact calculations are collected from subunits so there are some differences in interpreting the instructions. For instance assumptions about the expected utilization rate or about the cost increase and about the inflation are not harmonized. Also there are always some controversial items that some local controllers include and the others do not include in the cost basis.

Finally the internal margin is in many locations added on top of the price. Internal margin is not specified in the instructions and thus it is not systematically used. However, in many locations it is the culture to add for instance five percentage margin on top of the cost basis in defining the hourly rate but also all the buffers in hourly rate, reserves for costs that might have been forgotten and rounding up numbers create some internal margin to hourly rate. Also even though the instructions state that each subunit should have just one hourly rate, there are also entities who have defined several hourly rates. Cost centers with highly paid employees have higher hourly rate and correspondingly cost centers with low salaried employees have lower hourly rate.

According the process, the hourly rate is reviewed annually at the end of each fiscal year. Local controller is responsible to reviewing the cost estimate for the coming year and to providing an hourly rate that covers the relevant resource related costs. Corporate business control then approves the hourly rates and provides them to ERP team to be input to the system. However, in some cases the hourly rate may be changed also in the middle of the year, if a change or a mistake is identified in underlying assumptions. During this project the hourly rate was corrected twice in the middle of the financial year. First one was related to the changes in cost basis followed from restructuring the business and changing the organization structure. In the second case it was noticed after the first quarter that one subunit had increased their hourly rate but the cost level remained the same and thus the increase in hourly rate was reversed.

In pricing labor hours [Company X] is making the difference between labor hours included in delivery projects and on the other hand the service hours. For service hours there is price list existing defining service categories and the additional costs like traveling, accommodation and traveling hours. Local hands-on services are at one end of the listing and on the other hand global experts are at other end. However, this thesis is focusing on labor hours as part of delivery projects where [Company X] is utilizing cost-oriented approach. The locally defined hourly rate is the basis and the certain mark-up is added on top of this. The ideology still is that labor is just supporting portion in the total delivery project and it is priced to cover own costs with some extra. In practice it makes no difference if resources used in the project are junior engineers or senior engineers as the hourly rate is the same for both categories and thus also the hourly price is at the same level.

What makes then the difference in the total price, is the source of the labor. In estimating the costs it is of course not totally clear from which subunit the resources originate. However, the proposal manager can make the assumptions based on his expertize, on the earlier projects and on customer preferences what will be the split between locations. This way the split between on-shore and off-shore hours, the split between engineering hours in locations with high price level and in locations with low price level and so on can be included in the proposal. In estimation phase the hourly rate of the most significant subunit in the expected location is used, as there may be several subunits providing the resources with small differences in their hourly rates but split to the subunit level would not be relevant in proposal.

The prices from the cost-plus method are directional but proposal managers and later also sales personnel to some extent are responsible of reviewing the prices and adjusting based on market environment. For instance market analysis, understanding about the pricing practices of main competitors and benchmarking to other projects with the customer are vital tools for proposal manager whereas co-operation with customer and the allowed discount levels are relevant instruments in the sales negotiations. In the big picture [Company X] is not aiming at providing the lowest price on the market but delivering high quality and superior technology is the first selling argument. However, an adequate price level also plays a major role when customers are doing their purchase decisions.

4.3 Experienced challenges

In a local vehicle workshop with about ten employees and with the turnover of about one million euros setting the hourly price is relatively simple by calculating the costs of the workshop, by defining the target utilization rate for labor hours and by estimating the synergies with the invoiced hours and the revenue from spare parts. The calculated price is then controlled against the market situation so that it remains competitive and the size of the company enables the pricing to be continuously controlled and changed

in short-notice if needed. (Marttila 2015.) In theory the large companies are using the same principles in price setting but in practice the price setting process and the faced challenges are much more complicated.

The instructions to define hourly cost basis are well aligned with theory at [Company X]. However, when applying these instructions in practice, [Company X] is facing certain challenges. For instance the lack of harmonization and the lack of transparency are problematic issues faced in many discussions. Partly reflected from the issues in defining cost basis, [Company X] is facing challenges also in price setting for labor hours. The hourly rate is currently defined on a cost-based method and it can be questioned how this method – taken into consideration the challenges in defining the hourly cost – is responding to the requirements in global environment with several own locations, multinational customers and more and more competed market situation.

4.3.1 Transparency in hourly rate

Currently the hourly rates at [Company X] are defined by the finance & control department and the hourly price is set by proposal management based on the hourly rate. Proposal management has the basic knowledge how the hourly rate is set, but they are lacking the more detailed knowledge. Actually each local site has set their hourly rate individually based on the instructions but with few estimates of their own so neither does the corporate business control have exact knowledge how local hourly rates are defined. They are mainly controlling that the hourly rate level is correct.

Thus the question is the level of transparency within the company and its departments. It may be stated that the more transparent the costs and the prices are, the easier it is to control the cost basis. It can be seen if there are some internal margins included in the prices for instance by some local sites or in case the cost basis is realized to be too high, it is easier to find the elements that are on too high level or not even providing any contribution to the provided labor services as such. Internal margins are mentioned couple of times as in [Company X] there is still some features of suboptimization so that each legal entity aims at maximizing its own performance. Thus the locally set hourly rate may include some extra without corporate level having total transparency to the rates which further causes challenges to proposal managers to set competitive prices with adequate margins.

As a separate issue can be handled how much information the sales personnel should have about the cost basis. Alternatively as currently is done the sales personnel only have the list of suggested prices and additionally the maximum discount they can grant to customer. There is no clear solution if the sales efforts would be more efficient with total transparency to company’s cost structure or would they lack the understanding of the margin needed to cover all the indirect costs and thus be confused with the pricing decisions. In the negotiation it may be easier to be brave and say that the price cannot be

dropped anymore with only the information about the minimum price instead of having knowledge about the hourly rate.

Closely related to transparency is also the terminology used and that each stakeholder understands the terms similarly. The first task in the Proposal and Estimation Alignment -project was actually to define the terms for revenue and different margin levels as the understanding differed between individuals and between departments. According the ideal definition, the sales margin would only include direct project costs but in practice it is specified that at [Company X] also some indirect costs are included in sales margin as the hourly rate includes indirect delivery costs. However, the main point in defining the terminology is visibility and harmonization of the terms and not that much the discussion about certain cost objects if they should or should not be included in the hourly cost basis. More importantly everyone in the company analyzing, comparing and benchmarking costs and different margins should be aware about the costs included to each margin. For instance the one analyzing the sales margin should know if the margin only includes the direct costs for the project or if the hourly rate used has also included portion if indirect costs. Further it was discussed that calculating gross profit and operating profit are not that relevant at project level. However, it was also noted that calculating them with assumptions based on historical data supports the understanding of the big picture.

In many discussions the question arose which all costs are included in the hourly rate or if they need to be included in the estimate separately. For instance if all the safety equipment and safety clothing are included and on the other hand which tools are included and which are not included in the hourly rate. It is obvious that the minor tools like measuring tapes and also personnel equipment like laptops and mobile phones are included in the hourly rate but the more significant equipment like drilling machines or certain project specific safety equipment are often topic for discussion if they should be separately identified in the cost estimation or if they are already within the range of hourly rate.

One more point of view to the transparency of the hourly rate is the predictability of changes in hourly rate. Project costs are first estimated in the proposal management but as the project is sold to customer, the project is first budgeted and then the actuals are followed against the budget and also against the original proposal. In ideal situation the project manager would only be responsible for the efficiency, that is the amount of hours used. However, currently at [Company X] the cost of hours booked to the project varies depending on the entity who is supplying the hours and also over time as duration in many of the delivery projects is several years.

However, it may be challenging to create the system to follow the project based on the amount of hours as in financials this would using only one hourly rate. But at least the project manager should have the visibility and understanding how the labor cost is

formed. For instance at [Company X] there was a situation that in January the project used 100 hours and the labor cost was 7,000 units and in February the project received similarly 100 hours but the cost was 10,000 units. The situation is simple to explain as in January most of the hours originated from India and in February they originated in Germany. However, the situation was challenging for project manager who did not have the knowledge about the principles of using hourly rates in transferring costs to projects. Similarly the visibility to the cost assumptions in proposal, in budget and in actuals is important as changes for instance in the used hourly rate can then be used explaining the variances between the original margin estimate and the outcome. It's then another question again, how the duration of the project should be taken into consideration in the proposal phase. First significant delay may be already between [Company X] making the offer and the customer approving the offer and further the project actually starting. And after the start the duration of the project may be several years and additionally the project may be delayed from the original time schedule.

But in addition to the visibility to the cost accounting, the stakeholders need to have the understanding about the project level financials and also about the company level financials to avoid suboptimal decisions. One obvious example of this which is also identified at [Company X] is the situation where project manager prefers subcontractors over internal labor as the internal hourly rate exceeds the subcontractor cost. On the other hand this is natural behavior as the project manager is primarily responsible for his projects. Thus the transparency issue is also closely linked to responsibilities and day-to-day practices in the organization.

4.3.2 Transparency in hourly price

The level of details in the cost estimate and in the proposal can be viewed also from customers' point of view. In one hand the more detailed the proposal is, the better understanding it gives to the customer what they are paying for. Just one hourly price including all the labor and labor related costs may seem quite high, especially if the competitor is preparing their proposals with more details. It is easy to compare just the labor hours and come to conclusion that one offer is more expensive than the other one even though the content of the hourly price may be different. On the other hand detailed list of the items included in the labor and each of the lines priced separately may lead to the situation that the customer feels certain rows too expensive and starts to cut down certain rows. For instance if the safety equipment is separately priced, the customer may prefer excluding these rows and purchasing the equipment from another supplier.

The question about the scope of the order is more significant in terms of the total order, for instance if a company is providing the whole solution or just the equipment deliveries, but the same problematic can be seen in terms of labor. In case the lines are separate, the proposal must be designed so that the margin is in reasonable rows. Most of the margin is to be in the actual labor and the additional items should include a narrower

margin so that first of all customers would not prefer excluding them and also in case they would prefer excluding the additional items, the total margin of the project would not suffer from this. Delivering all the additional items to the customer would be beneficial to the company not only from the margin point of view but also from the practical point of view. If the customer starts to compete all the items and utilize many suppliers, the main contractor loses the controllability and there may be for instance quality and schedule issues. Internal transparency is significantly contributing the efforts to have the margin in the 'correct' hours but the decisions come from the customer which lines are to be included and which are to be included.

Depending on the delivery project [Company X] can be defined both as price maker and price taker. The role of price maker gets support from the high level of customization in the projects. However, in certain solutions or in the certain parts of the delivery projects the market is highly competed and the role gets closer to price taker. This brings a challenge of including the margin to certain labor hours in the delivery project. For instance engineering hours are a fixed part of the delivery project whereas some service hours are an additional part of the delivery. Thus margin in engineering hours might be slightly higher whereas the additional service hours can have lower price. This way the customer is guided to buying behavior that they purchase the whole package from the [Company X] and in case they want to limit the scope by cutting away the additional parts, [Company X] is not losing significant amount of margin.

Project scope may be changed at the late stage of the negotiations and customer should not be able to exclude the items with high margin. At [Company X] the higher margin could be for instance in project management hours whereas basic engineering hours might be priced at lower rates as outsourcing of those would be simpler. The level of details given to customer must be considered also when granting discounts in the negotiations. It may have even significant steering effects if the discount is given from the total delivery price, from the total labor price, from the certain labor item or from certain labor hour.

Dividing the labor to details in the offer and thus showing both the amount of hours and the hourly prices to the customer, makes it easier to argument the price to the customer. For instance the higher price level can be explained with the labor originating in high cost countries. However, the more exact specification of labor customers gets, the simpler it is for them to benchmark the prices, and as the delivery projects in the business of [Company X] are relatively large projects, benchmarking really has a significant role in negotiations. Customers can compare the prices with the offers from the competitors of [Company X], with the offers that they have earlier requested from [Company X] and also with the offers that [Company X] has made to other customers as some offers are available despite the confidentiality between the parties. Similar challenge with the ex-

ternal transparency that [Company X] is currently facing are the price lists that have been provided to the customer in the history. All the hourly prices are listed with the comment about annual index increases. As the customer has this information, it is challenging to argue why the prices are not aligned with the list prices.

4.3.3 Global market environment

[Company X] is operating in global business which means that it has to manage the different circumstances, different price levels and different cultures in different locations. [Company X] itself has employees in about 30 countries and on top of that the company has projects in many countries without permanent employees. Additionally most of the customers are multinational companies also operating in the global environment. Thus in price setting the company must consider especially location of its own work force, location of the project and location of its customer and not only the price level of these countries but also many other facts for instance pricing practices, legislation, taxation and cultural issues in these locations. And managing these dimensions gets even more complicated as most of the projects use work force from several locations and additionally many customers have projects in several locations. Additionally customer's opinion must be taken into consideration in the price setting. Customers may prefer labor from certain locations and they are often also willing to pay accordingly.

In global environment currencies and exchange rates are also something that companies need to work with. Prices can be set in euros, in US dollars or in local currencies but in every case there will be exchange differences over time. Especially significant effects in exchange rates highlight the effect of currencies. For instance from 2014 to 2015 euro has weakened significantly compared to US dollar which affects the price levels and margin levels especially in cases where labor is located in euro area and sales are booked in US dollars or vice versa. Changes in exchange rates also raise the question in which currency the hourly prices should be defined and how often they should be reviewed. Also in terms of currencies used the customer's preferences must be noted as they often have the decisive vote about the currency used in the contract. The selling party can then decide if they are willing to carry the exchange rate risk or if they hedge their currency position by purchasing derivative contracts.

Price discrimination is closely related to challenges in global market environment. Prices are adjusted according the location or according the customer to be more competitive and this way maximize the profits. But as described above, it is not obvious, which location should define the basis for price discrimination. Similarly it can be questioned if price level for certain customer should remain fixed or if the price would always be project specific. Naturally the competitive situation must always be taken into account in price setting: local competitors apply the local price level and global competitors are struggling with same challenges as [Company X]. However, the information from markets may also be misleading and only the project delivery location should not define the

price level. There is an example about this in [Company X] as they had a project in a newly industrialized country. The market assumptions were incorrect but still the hourly price was adjusted accordingly. The result was that customer chose the offer from [Company X] but in delivery stage it was found out that even subcontractors were invoicing higher hourly rates compared to the delivery of [Company X].

In addition to the challenges to harmonize the pricing principles in the global environment, another issue is to get all the proposal managers in different locations to operate accordingly. Currently each entity at [Company X] has its traditional ways to adjust prices which are mainly inherited but may partly affected for instance by local legislation. For sure there will be some resistance to change as new principles are implemented. Thus, the aim at [Company X] is not to force all the locations to new principles at once but first to define the renewed pricing practice and then step by step implement it to the units starting from the most significant ones.

4.3.4 The steering effect of hourly rate and price setting

In general the labor related deviations between the estimate margin and the actual margin are deviations either in hourly rate or deviations in the amount of hours. Currently at [Company X] the hourly rate and the hourly price have been defined pretty simply and thus most of the difference can be linked to the fact that more or less labor hours were used than estimated. However, this does not mean that there cannot be any issues in the hourly rate or in the hourly price. It is possible that the hourly price was too high and thus the customer wanted to avoid purchasing labor hours directly from [Company X]. Similarly the hourly rate may be too high and the estimator or the project manager is reluctant to offer hours for the customer as the hourly price gets too high or alternatively margin remains too low.

The steering impact of hourly rate and hourly price can be seen in many occasions. Customer making the purchase decision may want to exclude certain components from the contract based on the labor price which then may effect on the total structure and margin of the project. For estimator it may be easier to include some extra labor hours to the estimate in case they are priced too low whereas project managers may avoid using more expensive hours as they are responsible for the project costs. In the worst case scenario which has been noticed at [Company X] the project manager has preferred subcontractor hours as their cost has been lower than the hourly rate of own resources. As described above, similarly to the challenges with transparency also in steering impact it can be seen both internal and external levels.

As such defining the hourly rate does not directly affect the revenue and the margins of [Company X] as hourly rate is used only in transferring costs between functions and projects. However, hourly rate has significant indirect influence on decision making. The steering effect is emphasized especially when measuring and rewarding is linked to

the calculations. At [Company X] the projects are evaluated based on the project margins and functions are evaluated based on their net costs, that is gross costs deducted by labor hours booked to projects. Especially if the project costs seem to exceed the target, the project manager has the pressure to approve less hours and additionally to prefer hours from cheaper locations or from subcontractors in case they are providing the lowest price. On the other hand for instance the net cost target for engineering function is close to zero meaning that they should be able to book the estimated amount of hours to projects to achieve their target. Thus performance for engineering function looks the better the more hours they book to projects and it can be questioned if this guides to efficiency. Especially in downturn, when the current project is at the final phase and next project is not yet visible, it might be attractive to continue booking hours to the current project instead of using time effectively in finishing the project.

It can be argued if the better understanding to the costing system increases or decreases the gaming behavior. On one hand understanding, what really is measured enables the gaming but on the other hand the knowledge about the consequences in the company level should guide employees to enhance the overall productivity. In every case, avoiding suboptimization should be built into operating practices as there will always be at least some conflicts between the advantage of a subunit and the whole organization, either by accident or then because of some other motives affecting the hourly rates. For instance the company policy should not allow project manager to choose external resources over unutilized internal resources even though subcontractor rates would in some cases be lower. On the other [Company X] as a listed company is required to publish its performance quarterly and hourly rate is used in composing the profit and loss statement. Operating profit remains the same irrespective of the used hourly rate as the total amount of costs is fixed but the split between costs of goods sold, indirect delivery costs and operating costs is significantly affected by hourly rate. As analysts assess the company also based on its cost structure, the effect of hourly rate on profit and loss statement is one of the aspects that management needs to consider.

4.3.5 Proper price level in downturn

In downturn, low utilization of resources is an interesting topic at [Company X]. As discussed in the theory part, from purely mathematical point of view, it is more profitable to sell labor hours below the hourly cost than to carry the costs of unutilized resources. However, this is the case only in short-term and medium-term point of view as the unutilized resources are fixed costs but in the long-term approach the resources can be adjusted to the demand. At [Company X] most of the delivery projects must be planned at minimum from the medium-term point of view as the duration of delivery projects is dividing the labor hours for certain time period. Thus offering unutilized resources with deducted price might end up to the situation where most of the resources are employed in projects with low margins as the demand starts to increase and company could again reach a sustainable price.

The management must also consider what kind of effects lower hourly rate would have from the customer point of view. Depending on the cost-consciousness of the customers it may be possible to decrease prices temporarily, but most likely customers get used to the lower prices and it is then challenging for the sales function to explain the increase in prices. Especially as long as both amount of hours and hourly rate are defined in the contract, it would be risky to lower the hourly rate temporarily. On the other hand it might be an idea to exclude the hourly rate from the contract. In this case it would be easier to adjust the hourly rate because each delivery is customized so adjustments in hourly rate are not visible for the customer.

In general it can be argued if the prices should be decreased to win projects and maintain market share in downturn but the weak market situation in no case should increase the hourly price. At [Company X] certain actions were supporting this kind of thinking as in certain subunits a weak utilization rate was compensated by allocating additional portion of indirect costs to the utilized labor hours. In theory this means that standard costing was modified with features from actual costing. In this case the allocation of indirect costs was recalculated based on the lower utilization rate which increased the indirect costs allocated per labor hour. Combined with the cost-based pricing method, there are elements which would support the increase in prices. However, in practice the standard hourly rate was not changed and thus the pricing was not affected but only the existing projects suffered from the additional allocation.

4.4 Scenarios from alternative pricing methods

[Company X] should find ways to cope with the challenges mentioned above so that at the same time they maintain the competitive pricing and the profitability. As the hourly rate is reliable tool for the management, it steers the company to reach the orders that they are most competitive with. Projects requiring major amount of specialist hours are not sold with too low a price and on the other hand large projects which should benefit from economies of scale are not overpriced and lost. In this chapter there are outlined and compared certain alternative scenarios with different hourly cost definitions and with different pricing methods. The aim is to show how the price and profitability would be changing when the underlying approaches are modified. The more exact calculations are presented in appendix 1.

4.4.1 Pricing approach affecting labor price – project scenarios

Used pricing approach may have a significant effect on the final hourly price. In this chapter six different pricing scenarios are visualized with four example projects. The projects are presented in table 5 scenarios are current pricing model, pricing based on sending location, pricing based on job category, pricing based on sending location – job

category matrix and finally pricing based on receiving location with low price level and receiving location with high price level. From the pricing method point of view it can be stated that the first two scenarios (current model and sending location model) are using the cost-based approach and the third scenario is purely formed from value-based point of view. Scenario four being a matrix model is combining value-based and cost-based approaches whereas scenarios five and six are formed mainly with market-based approach.

The four example projects created to visualize the differences between the pricing models are split to engineering led and global expert led projects, as can be seen in the table 3. In this visualization Europe has been chosen as one source of labor because majority of [Company X] functions are situated in Europe. On the other hand Asia is presenting the source for cheaper labor as it is a current trend for Western companies to utilize the cheaper resources in newly industrialized countries in Asia. Also [Company X] has followed this trend and it has functions for instance in India. However, these areas are just examples and from the model point of view, instead of Europe and Asia the chosen areas could be any other two regions with different price levels.

Table 5. *Background data for scenarios: estimate for labor needed in different projects*

	Job 1	**Job 2**	**Job 3**	**Job 4**
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	500	500	300	300
- PM in Europe	500	250	300	150
- PM in Asia	0	250	0	150
Basic Engineering	2,000	2,000	200	200
- BE in Europe	2,000	200	200	0
- BE in Asia	0	1,800	0	200
Detail Engineering	1,000	1,000	200	200
- DE in Europe	1,000	100	200	0
- DE in Asia	0	900	0	200
Site Services / Support	500	500	300	300
- SS in Europe	100	100	300	0
- SS in Asia	400	400	0	300
TOTAL HOURS	**4,000**	**4,000**	**1,000**	**1,000**

First job is engineering led project where all the project management and engineering labor is situated in Europe. On the other hand site services are mainly handled by local labor in the cheaper area. Second job is similar to the first one except that half the pro-

ject management and most of the engineering work is transferred to countries with lower labor cost.

Job 3 and job 4 are representing a project requiring high expertise from the labor. Independent from the origin of labor, the labor must be highly educated and experienced. In the third job the global experts are originated only in Europe where in the fourth job the global experts mainly come from Asian countries. When calculating the labor rates in different scenarios it is assumed that in global expert led projects 75% of labor hours are global leading expert hours, 20% are senior expert hours and only 5% are junior expert hours. For the engineering led projects the same assumptions are 5% global leading expert hours, 70% senior expert hours and 25% junior expert hours.

First scenario visualizes the current situation of labor pricing at [Company X]. One hourly rate is calculated for each entity, and the hourly price is formed simply using the cost-plus method. In the calculations the hourly price for European labor is 100 units and for Asian labor 40 units. Also the second scenario applies the cost-plus approach but instead of one price per entity the starting point is one base price. Additionally there is a multiplying factor defined for each territory which then provides the final hourly price. In the calculations the base price is set to 100 units and thus the second scenario is very close to the first one. However, this scenario is not that dependent on the local hourly rates as the defined base price is the basis for the prices in all the market areas. In the calculations the multiplying factors are for Europe 1.0, for Asia 0.5, for South America 0.6 and for Australia 1.2.

Scenario 3 does not pay attention to the fact where the labor originates but the main idea is to categorize the labor hours to different tasks and estimate the value of these hours to the customer. It is for the management to decide what the relevant number of the job categories would be but here the labor is split to three categories: global leading experts, senior experts, junior experts. And just to highlight, the status of the employee is not the primary factor defining the category but the contribution he is giving to the project. Of course in practice these two often go hand in hand. The hourly prices used in the calculations would be 250 units for global leading expert, 110 units for senior expert and 80 units for junior expert. With adequately defined categories the average price can be kept at the same level than without categorizing. However, categorizing provides the management better visibility to the issue that which hours customers are willing to pay more and which hours are not that valuable for the customer.

Scenario 4 is combining the aspects from the scenarios 2 and 3. Jobs are categorized based on the nature of labor but also the cost level in the sending region is paid attention to by using the multiplying factor. Related to the scenario 4 it can be also discussed if all the job categories should be priced based on the labor origin or if for instance the global expert hours should be priced without the multiplying factor independent of the labor origin.

Scenario 5 and scenario 6 are delivering the same project on one hand in a more expensive location, in this case in Australia, and on the other hand in Brazil which is here representing a more inexpensive location. This way the market-approach is strongly applied in the pricing, as the price is modified based on the multiplying factor defined for the location (as mentioned above 0.6 for South America and 1.2 for Australia).

4.4.2 Engineering led projects

First project is an engineering led project where most of the labor originates in Europe. Labor needed is mainly engineering but additionally some project management and site services are offered to the custom Second project is similar to the first project and the hours required are at the same level with only the exception that now most of the labor originates in Asia. The labor pricing for the engineering led projects is compared in table 6 and in table 7 when different pricing practices are used.

Table 6. *Hourly price for engineering led project with labor from Europe in different scenarios*

	Scenario1 *current model*	**Scenario2** *sending location*	**Scenario3** *job category*	**Scenario4** *matrix model*	**Scenario5** *Brazil receiving*	**Scenario6** *Australia receiving*
Project Mgmt	50,000	50,000	54,750	54,750	30,000	60,000
- PM in Europe	50,000	50,000	54,750	54,750	30,000	60,000
- PM in Asia	0	0	0	0	0	0
Basic Engineering	200,000	200,000	219,000	219,000	120,000	240,000
- BE in Europe	200,000	200,000	219,000	219,000	120,000	240,000
- BE in Asia	0	0	0	0	0	0
Detail Engineering	100,000	100,000	109,500	109,500	60,000	120,000
- DE in Europe	100,000	100,000	109,500	109,500	60,000	120,000
- DE in Asia	0	0	0	0	0	0
Site Services	26,000	30,000	54,750	32,850	30,000	60,000
- SS in Europe	10,000	10,000	10,950	10,950	6,000	12,000
- SS in Asia	16,000	20,000	43,800	21,900	24,000	48,000
TOTAL PRICE	**376,000**	**380,000**	**438,000**	**416,100**	**240,000**	**480,000**
Price per hour	94	95	110	104	60	120

As the labor originates in Europe there are only minor variations between the scenarios with the exception of pricing based on receiving location with low price level. With this result it can be obviously questioned if the price in scenario 5 is profitable anymore as cost structure is based on the higher price level in Europe whereas the pricing is based on the lower cost level in Brazil.

Average price per hour is very close to each other in scenarios 1 and 2 which is natural as the counting principles are very close to each other in these two scenarios. On the

other hand scenarios 3 and 4 would price the project higher which raises the question if global leading expert hours are underpriced in the current model. Of course again the assumption must be considered about the split between job categories. For instance the assumption about global leading expert hours was 5% of total hours and in practice the portion may be higher or lower. However, the calculation points out that the nature of the work is not paid attention in current model.

Compared to the similar project utilizing labor from Asia in table 7, scenarios 3, 5 and 6 total to the same price as these scenarios don't make the difference between the origin of labor. Only the job category and on the other hand the receiving location are affecting the price.

Table 7. *Hourly price for engineering led project with labor from Asia in different scenarios*

	Scenario1 *current model*	**Scenario2** *sending location*	**Scenario3** *job category*	**Scenario4** *Matrix model*	**Scenario5** *Brazil receiving*	**Scenario6** *Australia receiving*
Project Mgmt	35,000	37,500	54,750	41,063	30,000	60,000
- PM in Europe	25,000	25,000	27,375	27,375	15,000	30,000
- PM in Asia	10,000	12,500	27,375	13,688	15,000	30,000
Basic Engineering	92,000	110,000	219,000	120,450	120,000	240,000
- BE in Europe	20,000	20,000	21,900	21,900	12,000	24,000
- BE in Asia	72,000	90,000	197,100	98,550	108,000	216,000
Detail Engineering	46,000	55,000	109,500	60,225	60,000	120,000
- DE in Europe	10,000	10,000	10,950	10,950	6,000	12,000
- DE in Asia	36,000	45,000	98,550	49,275	54,000	108,000
Site Services	26,000	30,000	54,750	32,850	30,000	60,000
- SS in Europe	10,000	10,000	10,950	10,950	6,000	12,000
- SS in Asia	16,000	20,000	43,800	21,900	24,000	48,000
TOTAL PRICE	**199,000**	**232,500**	**438,000**	**254,588**	**240,000**	**480,000**
Price per hour	50	58	110	64	60	120

As the cost basis for labor decreases, the hourly price in current model decreases accordingly. From other scenarios pricing model based on sending location, the matrix model and receiving location in the country with low price level results to the total price close to the current model.

On the other hand if the project is delivered to the location with high price level or if the value-based model is applied and pricing is based on job categories, the total price is significantly higher for customer and accordingly the margin would be high for the selling party. However, with these cases it may be challenging for the sales force to justify the pricing. It can be assumed that there is no difference in the quality of labor and thus customer receives the same value as when using European labor but customer are aware

of price level and they expect to pay less as they know the costs for selling party are lower. It may lead for instance to the situation that customers are willing to include only product management and site services to the total delivery and find alternative suppliers for engineering hours. Thus company may lose the competitive advantage gained from utilizing low cost labor as they still price the labor on market basis.

Also from the selling company's point of view scenarios, that do not make difference in labor origin, are problematic as the steering effect for proposal managers and further for project managers is clearly to prefer labor from low cost locations. This way pricing is closely linked to the larger picture including for instance quality issues, utilization rates, organization structure and customer preferences.

4.4.3 Global expert led projects

Global expert led projects are separately modelled as basic engineering services are much more easily available than labor with high expertize. In tables 8 and 9 the same pricing models are now demonstrated with global expert led project. First the project is assumed with European labor and then with Asian labor. But as mentioned, in global expert type of work it is less relevant where the labor originates as these services are not that easily available.

Table 8. *Hourly price for global expert led project with labor from Europe in different scenarios*

	Scenario1 *current model*	**Scenario2** *sending location*	**Scenario3** *job category*	**Scenario4** *matrix model*	**Scenario5** *Brazil receiving*	**Scenario6** *Australia receiving*
Project Mgmt	30,000	30,000	64,050	64,050	18,000	36,000
- PM in Europe	30,000	30,000	64,050	64,050	18,000	36,000
- PM in Asia	0	0	0	0	0	0
Basic Engineering	20,000	20,000	42,700	42,700	12,000	24,000
- BE in Europe	20,000	20,000	42,700	42,700	12,000	24,000
- BE in Asia	0	0	0	0	0	0
Detail Engineering	20,000	20,000	42,700	42,700	12,000	24,000
- DE in Europe	20,000	20,000	42,700	42,700	12,000	24,000
- DE in Asia	0	0	0	0	0	0
Site Services	30,000	30,000	64,050	64,050	18,000	36,000
- SS in Europe	30,000	30,000	64,050	64,050	18,000	36,000
- SS in Asia	0	0	0	0	0	0
TOTAL PRICE	**100,000**	**100,000**	**213,500**	**213,500**	**60,000**	**120,000**
Price per hour	100	100	214	214	60	120

Again scenarios 1 and 2 are pretty close to each other, scenarios 3, 5 and 6 provide the same total price irrespective of the labor origin and market-based scenario 5 and 6 are

problematic from profitability point of view how to maintain profitability in low cost location and on the other hand how to justify the price in high cost location. Hence, similar notes can be made from pricing effects in expert led projects as was done in engineering led projects. However, global expert led projects have some additional features.

Significantly higher price in scenarios 3 and 4 indicates that in current model global expert hours are currently offered at too low a price. This topic can be reviewed from both cost and price perspectives. As the work force providing global expert services has high competence in their field, they most likely are most likely also enjoying above average salary. Thus if all the labor hours are priced with the same principle based on average hourly rate, the actual margin from global expert hours may at quite low a level. Of course the situation is other way around for junior engineering hours but in any case these allocation biases provide certain advantage for global expert led projects. From customer point of view the contribution and the value that is received from global experts can be seen more stable than the contribution from basic engineers. There is less global experts available and in general they have more references about their expertise. And as customers have the transparency to the line items in offer, they prefer including global expert hours to their order over basic engineering hours as they get more value with the same price. Hence from financial perspective there is both internal and external steering effect towards utilizing more global expert labor in case all the hours are priced similarly.

The differences between highest and lowest prices are increasing even more as the global led experts originate in low cost locations as we can see in table 9.

Table 9. *Hourly price for global expert led project with labor from Asia in different scenarios*

	Scenario1 *current model*	**Scenario2** *sending location*	**Scenario3** *job category*	**Scenario4** *matrix model*	**Scenario5** *Brazil receiving*	**Scenario6** *Australia receiving*
Project Mgmt	21,000	22,500	64,050	48,038	18,000	36,000
- PM in Europe	15,000	15,000	32,025	32,025	9,000	18,000
- PM in Asia	6,000	7,500	32,025	16,013	9,000	18,000
Basic Engineering	8,000	10,000	42,700	21,350	12,000	24,000
- BE in Europe	0	0	0	0	0	0
- BE in Asia	8,000	10,000	42,700	21,350	12,000	24,000
Detail Engineering	8,000	10,000	42,700	21,350	12,000	24,000
- DE in Europe	0	0	0	0	0	0
- DE in Asia	8,000	10,000	42,700	21,350	12,000	24,000
Site Services	12,000	15,000	64,050	32,025	18,000	36,000
- SS in Europe	0	0	0	0	0	0
- SS in Asia	12,000	15,000	64,050	32,025	18,000	36,000
TOTAL PRICE	**49,000**	**57,500**	**213,500**	**122,763**	**60,000**	**120,000**
Price per hour	49	58	214	123	60	120

With the chosen assumptions the customer would receive from the global expert led project a value of 214 units per hour. In current model all the hours are handled as equal and the project would be offered for the customer with 49 units per hour. The difference between cost-based approach and value-based approach is obvious.

Compared to basic engineering hours it is more difficult to justify the price discrimination between global expert hours depending on their origin as the customer receives the same service. Similarly the question can be raised what the relevance of receiving location is in case of global expert led projects. As the business field is global, the value assumption is similar in different market areas and global experts are not available in local markets similarly to basic engineering. Hence with the assumption that there is demand for the global expert services what is the argument that pricing would be subject to local adjustments.

All in all each pricing model has its pros and cons. Current model (scenario 1) is simple and even though the model as such does not consider market situation or the value customer receives, the prices from the model are subject to adjustments. Scenario 2 is very close to the current situation only with the exception that local hourly rate is not directly affecting the price but the price level of sending location is estimated with multiplying factors. In value-based model (scenario 3) hours are priced based on the nature of the work with the aim to make the difference between job categories and thus to avoid the steering effect to suboptimal decisions. However, especially for basic engineering hours this may be difficult to justify to customers.

Scenario 4 aims at combining benefits from scenarios 2 and 3 being based on customer value adjusted by the labor origin. However, still the receiving market area is ignored and also the question if all the job categories should be similarly adjusted or not. Scenarios 5 and 6 provide a competitive price in each market area, but as they ignore the cost basis, in low cost locations it may be challenging to maintain margin levels and on the other hand in high cost locations it may be challenging to justify the higher price compared to low cost locations and in more detailed level to justify similar price level for hours originating from different locations.

4.5 Proposed guidelines for future pricing model

Currently [Company X] uses cost-plus method in pricing labor hours as part of a delivery project and this can be seen underlying in many of the faced challenges. The traditional ideology that labor hours are only supplementary items in the delivery project should be enhanced towards more value-based ideology. At [Company X] this is already done for labor hours in service business where different services are divided to certain price categories. In the long-run it might be beneficial to harmonize the labor pricing in the service business and in project deliveries but at first the approach could be benchmarking the enhancements of labor pricing included in delivery projects with the existing practices in the service business.

As labor hours are seen as supplementary items the mark-up pricing method has been a natural choice to cover the costs and gain the desired margin. Moving to market-based approach would pay attention to competitors but again it would bring other challenges for instance as the business environment is global after all. In literature value-based approach is presented as the superior pricing method but on the other hand it would be quite a dramatic change to current method and also there might be some challenges to apply pure value-based pricing to labor hours sold as one part of a delivery project. Hence the recommended model for [Company X] would combine elements from the main approaches applying the idea of matrix model presented as scenario 4 in the previous chapter. First of all, [Company X] should divide the labor hours to certain categories based on the expertise level of labor. Global experts should not be offered with the same price as junior engineering hours. Not to make the model too complicated the adequate amount of categories might be around five but the exact amount is for the management to decide. Another task would then be two define a global base price for these categories. Main benefit in here would be that the hourly price is not directly conducted from local hourly rates but the base prices are managed based both on the customer value and the cost basis assumptions.

Currently different cost levels in different market areas are considered by utilizing local hourly rates but in the combined model the same effect would be modelled by defining multiplying factors for each sending location. As the labor cost in India is just half the labor cost in Europe, the global base price would be multiplied by the defined factor

accordingly. Again in the iteration cycles it must then be considered what are the relevant multiplying factors, what is the amount of locations identified, how often the factors are reviewed and so on. Additionally especially related to labor with high expertise it must be discussed if hours in all the labor categories are subject to price adjustments. The result would be an internal reference price list which is simple for proposal manager to use as he has estimated the amount and origin of labor hours needed for the project. Implementing the new method would start with the main entities but step by step the pricing practice in all the subunits should be harmonized accordingly as otherwise there would be just another pricing method created but at the same time the lack of internal transparency to the pricing practices would remain and even increase. However, it is important to save the current practice that the calculated hourly price is then subject to adjustments related to general market environment, to receiving location circumstances and to certain customer specific issues. Additionally continuous reviewing process must be in place so that there is no conflicts between the pricing guidance and the business itself.

In addition to the actual pricing model, also the actual pricing process must be considered from defining the hourly cost to resulting to certain margin at the end of the process. Currently there are instructions existing how to define the subunit specific hourly rate. However the documentation how the instructions are applied is not generally available abut only the local controllers have the knowledge about the underlying facts and assumptions. Enhancing the documentation and additionally the communication between the finance & control organization and the proposal management, there would be significantly less confusion what is included in the hourly rate. And naturally the documentation should be available for all the stakeholders utilizing the hourly rate with the limitation that no confidential information is shared too widely.

Similarly each stakeholder should be aware of the hourly rates used in the different phases of the pricing process. From project follow-up point of view it would be ideal to have same hourly rate utilized in proposal phase, in budgeting phase and in actual reporting but in practice for instance the level of details and the changes over time make this impossible. Thus the communication and further the awareness should be increased among the ones interpreting the calculations that which part of the differences is related to real efficiency variance and which is just resulting from reporting system or from the changes that the project representatives have no influence on. Communication would also decrease the suboptimal decisions related to steering effect biases. Of course the primary option again would be to enhance the pricing process to prevent the biases to happen, for instance from financial perspective subcontractor hours and internal labor hours should be equal for the project manager. Hence the internal labor would be the primary resource and this would also support the [Company X] policy stating that external resources provide the flexibility in labor capacity. However, if the pricing model

still causes the bias, the understanding of higher level effects would decrease the suboptimal decisions based only on the project specific financials.

With these guidelines the alignment project would achieve its original targets. Pricing practice would be harmonized globally, the internal transparency to basis of hourly price and content of hourly rate would be enhanced and steering effect biases would have been decreased and additionally the awareness about the biases would have been increased in the organization. Naturally this model is only answering the challenges that are now identified and for sure also these guidelines are ignoring some relevant issues that are already existing or that will arise in the future. Thus the pricing model must be subject to continuous improvement process in the future so that it is supporting the business targets as fine as possible.

5. CONCLUSIONS

The main target of this thesis was to describe the current pricing practices at [Company X] and identify related challenges. To support the empirical target, the aim in the theory part was to define the cost basis for labor hours and further discuss about the theory and the current research around the pricing methods and pricing process. Additionally the identified challenges were then to be analyzed based on the theory part resulting to recommended guidelines and next steps for [Company X] how to continue further with the alignment project. In general it can be stated that the targets were achieved. The costing and pricing theories and the current research were widely reviewed and the understanding of the current pricing practices and related challenges at [Company X] was achieved. Validity of the study is aimed to be secured by approaching all the observations from the labor pricing point of view and by discussing widely with relevant stakeholders so that no point of view would be ignored. However, it must be mentioned that the topic was approached from the [Company X] point of view and hence external validity may suffer from the aim to optimize the internal validity. From the reliability point of view the participant as observer method completed with case interviews was a reasonable approach to the topic. Utilizing only case interviews might have understated problematic phases in the process or the practices in grey area and on the other hand by only observing certain challenges would have been difficult to notice. However, as the two methods were used combined, all the relevant topics were covered.

The importance of pricing can be underlined for the profitability of the companies but at the same time the field of pricing is not stable and there are no simple guidelines to find the optimal price. In terms of defining the labor price in global environment, both transparency in the underlying costs and understanding of the customers' preferences and of the market situation in different market areas are needed to reasonable pricing decisions. Hence first step in defining the labor price is to analyze the underlying cost structure. In general cost basis for labor hours consists of direct costs and allocated indirect costs. Allocation rules in dividing indirect costs can be seen as the main challenge in defining the cost basis. To enhance an allocation system simple enough, assumptions are used for instance related to utilization rate and to considering labor from different departments as equal. Hence the cost basis is always subject to allocation biases which burden certain labor hours too little whereas other labor hours suffer from too high portion of allocated costs. Cost basis added with the internal margin results then to internal hourly rate.

Three main theories to labor pricing are cost-based pricing, market-based pricing and value-based pricing. Cost-oriented approach is easy to implement and data is usually readily available. On the other hand allocation biases directly affect the price and mar-

ket approach is ignored in price setting. Market-oriented approach considers the competitive situation and still the data is relatively easy to collect. Hence the method is often used on highly competitive markets where the level of price discrimination is low. On the other hand, for certain products there is no market price available and also this approach ignores the customer approach. Value-oriented approach is widely regarded as superior to other pricing methods but currently it is still relatively rarely used compared to the first two pricing methods. Value-oriented approach provides direct link to customer and the value is defined based on his needs. On the other hand customer data is relatively difficult to collect and interpret. In practice companies can combine elements from all of the pricing methods to reach a price level that is adequate for both the company and the customers. In many situations pricing is also used as a strategic tool by aiming for instance at increasing the market share or at influencing common image of the product. However, irrespective of the used pricing practices, it is vital for the company to have the transparency in its cost basis.

This thesis was written in co-operation with a global technology company who started a project targeting to review and enhance its labor hour pricing practices especially as part of delivery projects. According to an internal study at [Company X] labor hours account for about ten percent of the total order value of a delivery project meaning that labor hours are not the main item but they still have a significant impact on the total project margin. Currently [Company X] uses cost-plus method in pricing labor hours as part of a delivery project. Corporate business control provides instructions how to calculate the internal hourly rate which local subunits are then applying in defining the entity specific hourly rates and reviewing them on annual basis. In actual pricing process the proposal manager is then estimating the origin of labor hours and accordingly using the local hourly rates added with the desired mark-up. After this the calculated prices are yet subject to the adjustments related to competitors' price level, to customers' reactions and to general market environment.

Identified challenges in the current pricing process can be identified to five categories: internal transparency, external transparency, global market environment, biases in steering effect of the pricing and pricing strategy in downturn. Internal transparency refers to the challenges within the organization, for instance the proposal management has no total understanding what costs are included in the hourly rate and what items should be invoiced separately, whereas external transparency refers to sharing information with customers. In many studies it is stated that information sharing with customer has certain advantages but on the other hand [Company X] has challenges with customers' price awareness. Once the certain price level is offered for them, it is challenging to justify the increase in prices. Operating in global environment forces companies to decide how to cope with differences between the market areas, and in terms of pricing the focus is especially on different price levels in different locations. Discussion around price discrimination and market pricing gets even more complicated as certain delivery

project gets input from several locations. When labor originates in Germany and in India, projects is delivered in Brazil and the customer is from US, the company must have guidelines how to apply the price level of each location.

Both hourly rate and hourly price also have an obvious steering impact on company's operations. Relatively high price for labor favors projects with high share of equipment sales and on the contrary relatively low price level is favorable for projects with high share of labor hours. In terms of steering effect the management must consider also possible biases leading to suboptimal decisions. If all the labor hours are considered as equal from pricing point of view, this results to the situation that labor with high expertise is underpriced. Similarly measuring project profitability based on hourly rates may lead to the situation that it is beneficial for project manager to prefer subcontractors with lower hourly price over the unutilized own resources which in the company level may double the costs. Pricing strategy in downturn is closely related to the steering effect of the pricing but it is specified as a separate category as the global downturn at the end of first decade of 21st century made the topic highly relevant. The discussion can be summarized with the question if the company should temporarily lower its prices to maintain volumes and utilization rate of its resources.

To respond the defined challenges, the recommendation for future guidelines would be to transfer from cost-plus pricing to more value oriented pricing. The hourly rate would no more directly affect the hourly price but the labor would be categorized to a few categories and an hourly base price would be defined for each category. The base price would then be adjusted by multiplying factors based on certain variables, for instance project delivery location, labor origin and customer specific details. In practice the next steps for the [Company X] would be to form a draft version from the aligned pricing model and start iteration cycles with the relevant stakeholders. Additionally [Company X] should enhance its internal transparency and communication. For instance calculations how the hourly rates are formed should be explicitly documented and made available for everyone utilizing the hourly rate. Similarly the awareness about the steering effect biases should be enhanced among employees, for instance among proposal managers and project managers, so that decisions would not be made based only on the project specific financials.

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APPENDIX A: ASSUMPTIONS AND CALCULATIONS FOR PRICING SCENARIOS

In the following calculations all the values presented as bare numbers are assumptions whereas all the calculations are shown as a total formula.

Project scenarios with estimate about labor hours needed

	Job 1	Job 2	Job 3	Job 4
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	500+0=500	250+250=500	300+0=300	150+150=300
- PM in Europe	500	250	300	150
- PM in Asia	0	250	0	150
Basic Engineering	2,000+0=2,000	200+1,800=2,000	200+0=200	0+200=200
- BE in Europe	2,000	200	200	0
- BE in Asia	0	1,800	0	200
Detail Engineering	1,000+0=1,000	100+900=1,000	200+0=200	0+200=200
- DE in Europe	1,000	100	200	0
- DE in Asia	0	900	0	200
Site Services / Support	100+400=500	100+400=500	300+0=300	0+300=300
- SS in Europe	100	100	300	0
- SS in Asia	400	400	0	300
TOTAL HOURS	**500+2,000+1,000 +500=4,000**	**500+2,000+1,000 +500=4,000**	**300+200+300 +200=1,000**	**300+200+300 +200=1,000**

Assumptions and calculations for scenario 1 – entity based hourly rate (current model)

- Hourly price in Europe 100
- Hourly price in Asia 40

	Job 1	Job 2	Job 3	Job 4
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	50,000+0 =50,000	25,000+10,000 =35,000	30,000+0 =30,000	15,000+6,000 =21,000
- PM in Europe	500*100=50,000	250*100=25,000	300*100=30,000	150*100=15,000
- PM in Asia	0*40=0	250*40=10,000	0*40=0	150*40=6,000
Basic Engineering	200,000+0 =200,000	20,000+72,000 =92,000	20,000+0 =20,000	0+8,000 =8,000
- BE in Europe	2,000*100 =200,000	200*100 =20,000	200*100 =20,000	0*100 =0
- BE in Asia	0*40=0	1,800*40=72,000	0*40=0	200*40=8,000
Detail Engineering	100,000+0 =100,000	10,000+36,000 =46,000	20,000+0 =20,000	0+8,000 =8,000
- DE in Europe	1,000*100 =100,000	100*100 =10,000	200*100 =20,000	0*100 =0
- DE in Asia	0*40=0	900*40=36,000	0*40=0	200*40=8,000
Site Services / Support	10,000+16,000 =26,000	10,000+16,000 =26,000	30,000+0 =30,000	0+12,000 =12,000
- SS in Europe	100*100=10,000	100*100=10,000	300*100=30,000	0*100=0
- SS in Asia	400*40=16,000	400*40=16,000	0*40=0	300*40=12,000
TOTAL HOURS	**50,000+200,000 +100,000+26,000 =376,000**	**35,000+92,000 +46,000+26,000 =199,000**	**30,000+20,000 +20,000+30,000 =100,000**	**21,000+8,000 +8,000+12,000 =49,000**

Assumptions and calculations for scenario 2 – sending location model

- Base price 100
- Multiplying factors for locations
  - Europe 1.0
  - Asia 0.5
  - South America 0.6
  - Australia 1.2

	Job 1	Job 2	Job 3	Job 4
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	50,000+0 =50,000	25,000+12,500 =37,500	30,000+0 =30,000	15,000+7,500 =22,500
- PM in Europe	500*100*1.0 =50,000	250*100*1.0 =25,000	300*100*1.0 =30,000	150*100*1.0 =15,000
- PM in Asia	0*100*0.5 =0	250*100*0.5 =12,500	0*100*0.5 =0	150*100*0.5 =7,500
Basic Engineering	200,000+0 =200,000	20,000+90,000 =110,000	20,000+0 =20,000	0+10,000 =10,000
- BE in Europe	2,000*100*1.0 =200,000	200*100*1.0 =20,000	200*100*1.0 =20,000	0*100*1.0 =0
- BE in Asia	0*100*0.5 =0	1,800*100*0.5 =90,000	0*100*0.5 =0	200*100*0.5 =10,000
Detail Engineering	100,000+0 =100,000	10,000+45,000 =55,000	20,000+0 =20,000	0+10,000 =10,000
- DE in Europe	1,000*100*1.0 =100,000	100*100*1.0 =10,000	200*100*1.0 =20,000	0*100*1.0 =0
- DE in Asia	0*100*0.5 =0	900*100*0.5 =45,000	0*100*0.5 =0	200*100*0.5 =10,000
Site Services / Support	10,000+20,000 =30,000	10,000+20,000 =30,000	30,000+0 =30,000	0+15,000 =15,000
- SS in Europe	100*100*1.0 =10,000	100*100*1.0 =10,000	300*100*1.0 =30,000	0*100*1.0 =0
- SS in Asia	400*100*0.5 =20,000	400*100*0.5 =20,000	0*100*0.5 =0	300*100*0.5 =15,000
TOTAL HOURS	**50,000+200,000 +100,000+30,000 =380,000**	**37,500+110,000 +55,000+30,000 =232,500**	**30,000+20,000 +20,000+30,000 =100,000**	**22,500+10,000 +10,000+15,000 =57,500**

Assumptions and calculations for scenario 3 – job categories model

- Job categories
  - Global Leading Expert 250
  - Senior Expert 110
  - Junior Expert 80
- Labor split to categories in engineering project
  - Global Leading Expert 5%
  - Senior Expert 70%
  - Junior Expert 25%
- Labor split to categories in global expert project
  - Global Leading Expert 75%
  - Senior Expert 20%
  - Junior Expert 5%
- Average price in engineering project
  - 250*5% + 110*70% + 80*25% = 109.5
- Average price in global expert project
  - 250*75% + 110*20% + 80*5% = 213.5

	Job 1	**Job 2**	**Job 3**	**Job 4**
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	54,750+0 =54,750	27,375+27,375 =54,750	64,050+0 =64,050	32,025+32,023 =64,050
- PM in Europe	500*109.5 =54,750	250*109.5 =27,375	300*213.5 =64,050	150*213.5 =32,025
- PM in Asia	0*109.5 =0	250*109.5 =27,375	0*213.5 =0	150*213.5 =32,025
Basic Engineering	219,000+0 =219,000	21,900+197,100 =219,000	42,700+0 =42,700	0+42,700 =42,700
- BE in Europe	2,000*109.5 =219,000	200*109.5 =21,900	200*213.5 =42,700	0*213.5 =0
- BE in Asia	0*109.5 =0	1,800*109.5 =197,100	0*213.5 =0	200*213.5 =42,700
Detail Engineering	109,500+0 =109,500	10,950+98,550 =109,500	42,700+0 =42,700	0+42,700 =42,700
- DE in Europe	1,000*109.5 =109,500	100*109.5 =10,950	200*213.5 =42,700	0*213.5 =0
- DE in Asia	0*109.5 =0	900*109.5 =98,550	0*213.5 =0	200*213.5 =42,700
Site Services / Support	10,950+43,800 =54,750	10,950+43,800 =54,750	64,050+0 =64,050	0+64,050 =64,050
- SS in Europe	100*109.5 =10,950	100*109.5 =10,950	300*213.5 =64,050	0*213.5 =0
- SS in Asia	400*109.5 =43,800	400*109.5 =43,800	0*213.5 =0	300*213.5 =64,050
TOTAL HOURS	**54,750+219,000 +109,500+54,750 =438,000**	**54,750+219,000 +109,500+54,750 =438,000**	**64,050+42,700 +42,700+64,050 =213,500**	**64,050+42,700 +42,700+64,050 =213,500**

Assumptions and calculations for scenario 4 –job categories and location matrix model

- Basis from scenario 3
- Multiplying factors for locations
  - Europe 1.0
  - Asia 0.5
  - South America 0.6
  - Australia 1.2

	Job 1	Job 2	Job 3	Job 4
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	54,750+0 =54,750	27,375+13,688 =41,063	64,050+0 =64,050	32,025+16,013 =48,038
- PM in Europe	54,750*1.0 =54,750	27,375*1.0 =27,375	64,050*1.0 =64,050	32,025*1.0 =32,025
- PM in Asia	0*0.5 =0	27,375*0.5 =13,688	0*0.5 =0	32,025*0.5 =16,013
Basic Engineering	219,000+0 =219,000	21,900+98,500 =120,450	42,700+0 =42,700	0+21,350 =21,350
- BE in Europe	219,000*1.0 =219,000	21,900*1.0 =21,900	42,700*1.0 =42,700	0*1.0 =0
- BE in Asia	0*0.5 =0	197,100*0.5 =98,550	0*0.5 =0	42,700*0.5 =21,350
Detail Engineering	109,500+0 =109,500	10,950+49,275 =60,225	42,700+0 =42,700	0+21,350 =21,350
- DE in Europe	109,500*1.0 =109,500	10,950*1.0 =10,950	42,700*1.0 =42,700	0*1.0 =0
- DE in Asia	0*0.5 =0	98,550*0.5 =49,275	0*0.5 =0	42,700*0.5 =21,350
Site Services / Support	10,950+21,900 =32,850	10,950+21,900 =32,850	64,050+0 =64,050	0+32,025 =32,025
- SS in Europe	10,950*1.0 =10,950	10,950*1.0 =10,950	64,050*1.0 =64,050	0*1.0 =0
- SS in Asia	43,800*0.5 =21,900	43,800*0.5 =21,900	0*0.5 =0	64,050*0.5 =32,025
TOTAL HOURS	**54,750+219,000 +109,500+32,850 =416,100**	**41,063+120,450 +60,225+32,850 =254,588**	**64,050+42,700 +42,700+64,050 =213,500**	**48,038+21,350 +21,350+32,025 =122,763**

Assumptions and calculations for scenario 5 – receiving location model / Brazil

- Base price 100
- Multiplying factors for locations
  - Europe 1.0
  - Asia 0.5
  - South America 0.6
  - Australia 1.2

	Job 1	Job 2	Job 3	Job 4
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	30,000+0 =30,000	15,000+15,000 =30,000	18,000+0 =18,000	9,000+9,000 =18,000
- PM in Europe	500*100*0.6 =30,000	250*100*0.6 =15,000	300*100*0.6 =18,000	150*100*0.6 =9,000
- PM in Asia	0*100*0.6 =0	250*100*0.6 =15,000	0*100*0.6 =0	150*100*0.6 =9,000
Basic Engineering	120,000+0 =120,000	12,000+108,000 =120,000	12,000+0 =12,000	0+12,000 =12,000
- BE in Europe	2,000*100*0.6 =120,000	200*100*0.6 =12,000	200*100*0.6 =12,000	0*100*0.6 =0
- BE in Asia	0*100*0.6 =0	1,800*100*0.6 =108,000	0*100*0.6 =0	200*100*0.6 =12,000
Detail Engineering	60,000+0 =60,000	6,000+54,000 =60,000	12,000+0 =12,000	0+12,000 =12,000
- DE in Europe	1,000*100*0.6 =60,000	100*100*0.6 =6,000	200*100*0.6 =12,000	0*100*0.6 =0
- DE in Asia	0*100*0.6 =0	900*100*0.6 =54,000	0*100*0.6 =0	200*100*0.6 =12,000
Site Services / Support	6,000+24,000 =30,000	6,000+24,000 =30,000	18,000+0 =18,000	0+18,000 =18,000
- SS in Europe	100*100*0.6 =6,000	100*100*0.6 =6,000	300*100*0.6 =18,000	0*100*0.6 =0
- SS in Asia	400*100*0.6 =24,000	400*100*0.6 =24,000	0*100*0.6 =0	300*100*0.6 =18,000
TOTAL HOURS	**30,000+120,000 +60,000+30,000 =240,000**	**30,000+120,000 +60,000+30,000 =240,000**	**18,000+12,000 +12,000+18,000 =60,000**	**18,000+12,000 +12,000+18,000 =60,000**

Assumptions and calculations for scenario 6 – receiving location model / Australia

- Base price 100
- Multiplying factors for locations
  - Europe 1.0
  - Asia 0.5
  - South America 0.6
  - Australia 1.2

	Job 1	**Job 2**	**Job 3**	**Job 4**
	Engineering led project, labor in Europe	**Engineering led project, labor in Asia**	**Global expert led project, labor in Europe**	**Global expert led project, labor in Asia**
Project Management	60,000+0 =30,000	30,000+30,000 =30,000	36,000+0 =36,000	18,000+18,000 =36,000
- PM in Europe	500*100*1.2 =60,000	250*100*1.2 =30,000	300*100*1.2 =36,000	150*100*1.2 =18,000
- PM in Asia	0*100*1.2 =0	250*100*1.2 =30,000	0*100*1.2 =0	150*100*1.2 =18,000
Basic Engineering	240,000+0 =240,000	24,000+216,000 =240,000	24,000+0 =24,000	0+24,000 =24,000
- BE in Europe	2,000*100*1.2 =240,000	200*100*1.2 =24,000	200*100*1.2 =24,000	0*100*1.2 =0
- BE in Asia	0*100*1.2 =0	1,800*100*1.2 =216,000	0*100*1.2 =0	200*100*1.2 =24,000
Detail Engineering	120,000+0 =120,000	12,000+108,000 =120,000	24,000+0 =24,000	0+24,000 =24,000
- DE in Europe	1,000*100*1.2 =120,000	100*100*1.2 =12,000	200*100*1.2 =24,000	0*100*1.2 =0
- DE in Asia	0*100*1.2 =0	900*100*1.2 =108,000	0*100*1.2 =0	200*100*1.2 =24,000
Site Services / Support	12,000+48,000 =60,000	12,000+48,000 =60,000	36,000+0 =26,000	0+36,000 =36,000
- SS in Europe	100*100*1.2 =12,000	100*100*1.2 =12,000	300*100*1.2 =26,000	0*100*1.2 =0
- SS in Asia	400*100*1.2 =48,000	400*100*1.2 =48,000	0*100*1.2 =0	300*100*1.2 =36,000
TOTAL HOURS	**60,000+240,000 +120,000+60,000 =480,000**	**60,000+240,000 +120,000+60,000 =480,000**	**36,000+24,000 +24,000+36,000 =120,000**	**36,000+24,000 +24,000+36,000 =120,000**